THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LVI. No. 1422.] LONDON, AUGUST 12, 1890. [42ND YEAR. Price 6d.

Ashmore, Benson, Pease, & Co., Ltd.

GASHOLDERS.
CONDENSERS.
SCRUBBERS.
PURIFIERS.
RETORT-APPLIANCES.
CONSTRUCTIONAL IRONWORK.
DAVIS'S AMMONIA STILLS.

STOCKTON-ON-TEES.

Illustrated Gas-Works Catalogue.

— ESTABLISHED 1830. —
PARKER & LESTER,
Manufacturers & Contractors.

THE ONLY MAKERS OF
PATENT ANTIMONY PAINT,
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores for Gas and Water Works.

WORKS:
ORMSIDE STREET, OLD KENT ROAD,
LONDON.

WOLSTON'S TORBAY PAINTS
Special Quotations to Gas Companies.
23, GREAT GEORGE ST., WESTMINSTER, S.W.

CEMENT
EARLE'S
BEST
Portland Cement
MANUFACTURED BY
GEO. & THOS. EARLE,
HULL.

Office: 7, PIER STREET.
Works: WILMINGTON.
STOREAGE CAPACITY 10,000 Tons.

ESTABLISHED 1811—OVER THREE QUARTERS OF A CENTURY.
Telegraphic Address: "CEMENT HULL."

SPENT LIMES NO LONGER WASTE PRODUCTS.
Under G. R. HISLOP'S PATENTS
All Spent Limes are most effectually, economically, and continuously recovered, and at from one-third to one-half the cost of New Lime. The results are a surprise to all who have inspected the process, and are entirely satisfactory to all now using it. Descriptive Pamphlet and Terms from Agents as under.

— REGENERATIVE SETTINGS OF RETORTS. —
Hislop's Patent Producer and Patent Charging Appliances offer advantages which are unapproachable, while in every other detail his Settings are confidently recommended as being the most inexpensive and effective possible.

Illustrated Pamphlet and Terms on application to J. E. FISHER, Stourbridge, Agent for England and Wales; to C. M. HAMILTON, Portland Place, Hamilton, Agent for Scotland and Ireland; and for all other Countries to the Patentee,
Geo. R. HISLOP, Gas Engineer, PAISLEY, N.B.

C. & W. WALKER.
GASHOLDERS; PURIFIERS;
PURIFYING MACHINES;
CO_2 AND TAR-EXTRACTING WASHERS; SCRUBBERS;
SULPHATE & SULPHUR PLANT;
RETORT MOUTHPIECES; CONDENSERS;
LIFTING APPARATUS; CENTRE AND FOUR-WAY VALVES;
SLIDE VALVES; TAR BURNERS; &C. &C.
WOOD SIEVES.

ADDRESSES: 8, Finsbury Circus, London, E.C.; Midland Iron-Works, Donnington, near Newport, Shropshire.
"FORTRESS LONDON," "FORTRESS DONNINGTON,"—Telegraphic.

SAWER AND PURVES,

LATE

FLETCHER AND MURPHY,

GARRATT STREET WORKS, OLDHAM ROAD, MANCHESTER,

Manufacturers of

IMPROVED CONSUMER'S WET GAS-METERS

IN CAST-IRON CASES,

THE UNVARYING WATER-LINE GAS-METER,

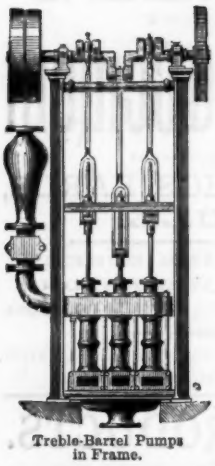
AND

IMPROVED DRY GAS-METERS;

Also Sole Makers of THORP AND MARSH'S PATENT CASH PREPAYMENT ATTACHMENT FOR GAS-METERS.

STEAM & HAND PUMPS FOR GAS-WORKS.

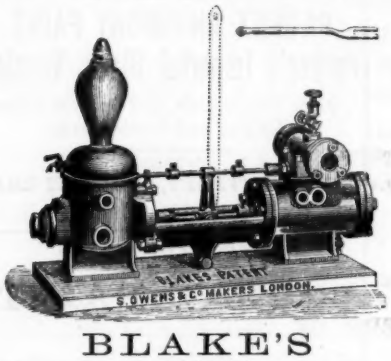
FOR PUMPING TAR, WATER, AND LIQUOR.



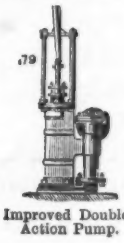
Treble-Barrel Pumps in Frame.

Double-Barrel Force-Pump in Frame.

Syphon Pump.



BLAKE'S
PATENT
STEAM PUMPS.
20,000 IN USE.



Improved Double Action Pump.

Cast-Iron Hand-Pump.

Wrought-Iron Portable Pump.

S. OWENS & CO., Hydraulic, Gas, & General Engineers, WHITEFRIARS ST., LONDON, E.C.

SOLE MANUFACTURERS OF

MANN & OWENS' PATENT SCREW & CAM, also FULL-WAY RACK & PINION GAS-VALVES.

S. O. and Co.'s New Catalogue of Gas Apparatus and General Machinery can be had on application.

NEWTON, CHAMBERS, & CO., LIMITED,

THORNCLIFFE IRON-WORKS, near SHEFFIELD,

MANUFACTURERS OF

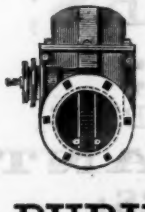
SLIDE VALVES,
WITH RACK & PINION,
OR
Internal or External
SCREWS, of all Sizes.

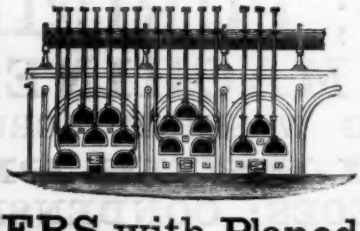
GASHOLDERS,
AND
Gasholder Tanks.

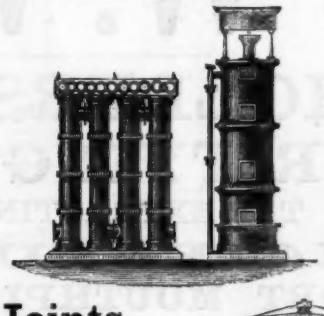
CAST-IRON RETORTS,
RETORT-BED FITTINGS,
And Retort-House Appliances
of every description,
Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

WROUGHT AND CAST IRON
CONDENSERS,
SCRUBBERS, & WASHERS,
TAR AND LIQUOR PUMPS, &c.

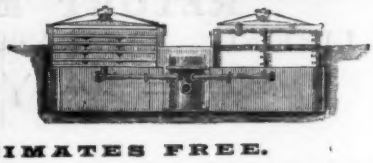
PATENT
CENTRE VALVES
for working Purifiers.
Also Bye-Pass & Stop Valves.







PURIFIERS with Planed Joints,
HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS,
WOOD GRIDS.
CAST AND WROUGHT IRON TANKS AND CISTERNS.



DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

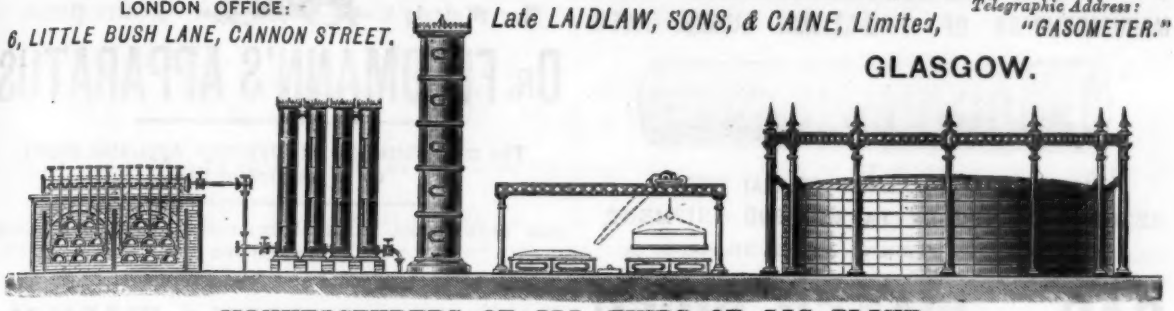
GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

THE BARROWFIELD IRON-WORKS, LIMITED,

LONDON OFFICE:
6, LITTLE BUSH LANE, CANNON STREET.

Late LAIDLAW, SONS, & CAINE, Limited,
GLASGOW.

Telegraphic Address:
"GASOMETER."



MANUFACTURERS OF ALL KINDS OF GAS PLANT.

RETORT-BENCH FITTINGS; SIEMENS'S REGENERATIVE AND ORDINARY FURNACES;
CONDENSERS, EXHAUSTERS, AND ENGINES; SCRUBBERS, WASHERS;
PURIFIERS, WITH PLANED AND CEMENT JOINTS;
DRY AND HYDRAULIC CENTRE-VALVES;
HYDRAULIC AND HAND-POWER LIFTING APPARATUS;
GASHOLDERS, SINGLE-LIFT & TELESCOPE; CAST & WROUGHT IRON TANKS;
STATION METERS; GOVERNORS; SCREW AND RACK VALVES;
FOUR-WAY COCKS AND HYDRAULIC VALVES;
CAST-IRON GAS, WATER, & STEAM PIPES & CONNECTIONS; WROUGHT-IRON TUBES & FITTINGS;
IRON ROOFING, MARKET BUILDINGS, BRIDGES, GIRDERS, STEAM BOILERS;
PROMENADE PIERS AND LOADING WHARVES.

MANUFACTURERS OF OIL PLANT OF EVERY DESCRIPTION.

HENDERSON'S Patent Retorts, Condensers, Stills, Cast and Wrought Iron Tanks, Ammonia Stills, Wrought-Iron Gas-Mains, &c., &c.

DESCRIPTIVE SPECIFICATIONS AND ESTIMATES ON APPLICATION.

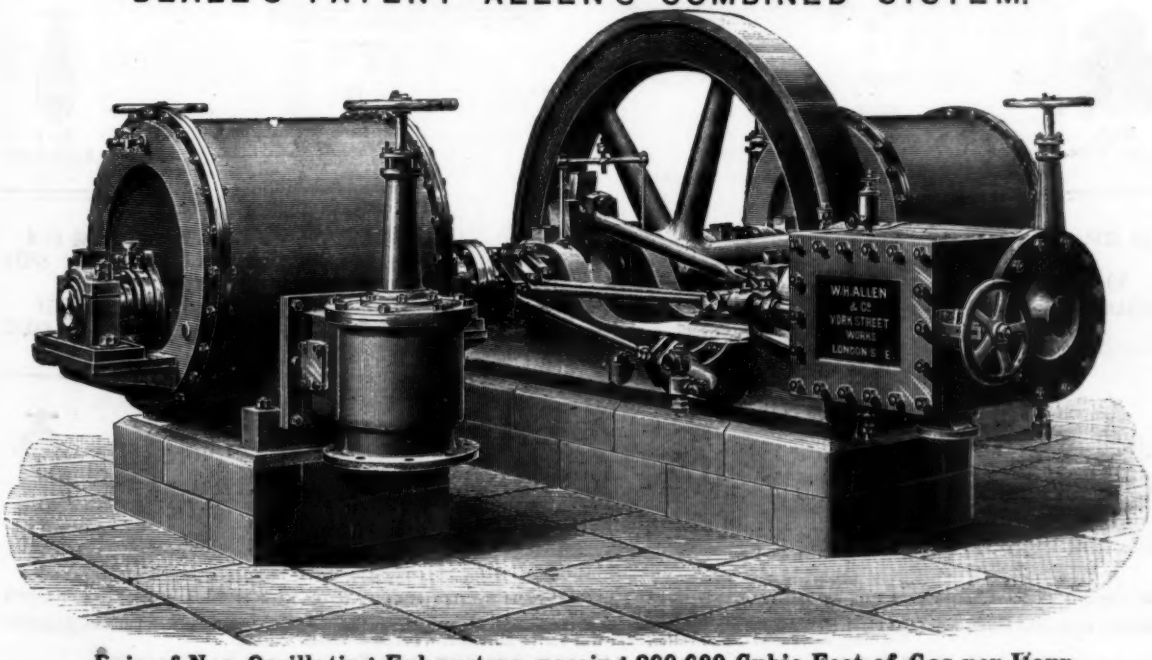
W. H. ALLEN & CO.,

York Street Works, LAMBETH, LONDON, S.E.,

MAKERS OF THE MOST IMPROVED FORM OF

GAS EXHAUSTING MACHINERY.

BEALE'S PATENT—ALLEN'S COMBINED SYSTEM.



Pair of Non-Oscillating Exhausters, passing 200,000 Cubic Feet of Gas per Hour.

JOHN HALL & CO.,

STOURBRIDGE,

MANUFACTURERS OF FIRE-BRICKS, LUMPS, TILES,

AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

RETORTS CAREFULLY PACKED FOR SHIPMENT.

A STOCK OF DIFFERENT SHAPES ON HAND.

GAS AND WATER PIPES

AND

CASTINGS OF EVERY DESCRIPTION.

MANUFACTURED BY THE

CLAY CROSS COMPANY,

CHESTERFIELD.

TRADE	TELEGRAMS:	LONDON AGENTS:
C X C	"JACKSON"	BECK & Co.
MARK.	CLAY CROSS.	1 0, GT. SUFFOLK ST., S.E.

SULPHATE OF AMMONIA.

By Her Majesty's Royal Letters Patent.

DR. FELDMANN'S APPARATUS

The most successful and approved Apparatus known up to the present time.

FOR REFERENCES, PARTICULARS, TESTIMONIALS, AND PRICES APPLY TO THE

Sole Agents and Manufacturers,

GODDARD, MASSEY, & WARNER,

ENGINEERS,

NOTTINGHAM.

The Apparatus has been supplied to the following Firms–

BURT, BOULTON, & HAYWOOD, SILVERTOWN, and ELING.
CHANCE BROTHERS, OLDBURY (4 Apparatus).
RUNCORN SOAP & ALKALI CO., Limited, RUNCORN.
NETHAM CHEMICAL CO., Limited, BRISTOL.
ANIMAL CHARCOAL CO., Limited, SHADWELL.
WM. BUTLER & CO., BRISTOL.
KEMPSON & CO., Pye Bridge.

And to the following Gas Companies and Corporations–

ILKESTON.	BURY.	CHORLEY.
WIDNES	BRIGHOUSE.	WHITEHAVEN.
HALIFAX.	MARKET HARBRO'.	CHESTER.
ALTRINCHAM.	PRESCOT.	SOUTH SHIELDS.
DENTON.	SOWERBY BRIDGE.	LEEK.
ST. ALBANS.	LEICESTER.	IPSWICH.
DUKINFIELD.	DARWEN.	BOURNEMOUTH.
NORTHWICH.	NELSON.	SALFORD.
HUDDERSFIELD.	ORMSKIRK.	LUTON.
		HAMPTON COURT.

R. DEMPSTER & SONS, Ltd.,

ESTABLISHED 1855.

ROSE MOUNT GAS ENGINEERING WORKS,

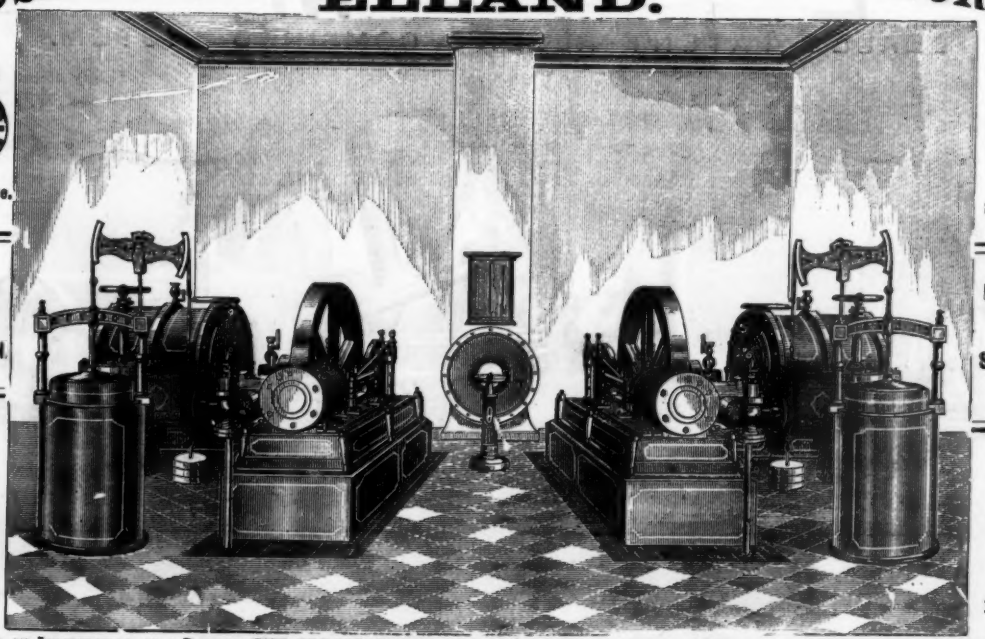
ELLAND.

No. 1. Flange Valve.

NO SLIP.

NO OSCILLATION.

No. 3. Screw Valve.



No. 5. Screw Valve.

NO HIGH SPEED.

STEADY GAUGE.

No. 6. Disc Valve.

THE ABOVE IS AN ILLUSTRATION OF A PAIR OF THE ELLAND ROTARY EXHAUSTERS ERECTED BY US AT WIGAN, EACH OF WHICH ARE CAPABLE OF PASSING 80,000 CUBIC FEET OF GAS PER HOUR.

Makers of every other description of Gas Plant, including Retorts, Retort Mountings, Condensers, Washers, Tar and Liquor Separators, Scrubbers, Purifiers, Gasholders any size, Patent Centre-Valves, Four-Way Valves, Rack, Screw, and other Valves.

Testimonials and References on Application to

DEMPSTERS', ELLAND.

G. J. EVESON,

GAS COAL AND CANNEL CONTRACTOR,

PATENTEE OF

A SPECIAL COMPOUND

FOR THE CURE OF STOPPED ASCENSION-PIPES,

A couple of charges of which will clear a stopped pipe, and an occasional charge keeps them clean, and also increases the make per ton and the illuminating power.

PRICE AND PARTICULARS ON APPLICATION.

Head Office: **CORPORATION STREET, BIRMINGHAM.**

WILLEY & CO.,

GAS ENGINEERING WORKS, COMMERCIAL ROAD, EXETER

London Offices: 6 & 7, KING WILLIAM STREET, E.C.

MANUFACTURERS OF EVERY DESCRIPTION OF

GAS APPARATUS,

GASHOLDERS, Telescope and Single-Lift, any size. Some of the largest in the Kingdom erected by this Firm are giving the highest satisfaction.

PLANS and SPECIFICATIONS furnished for **Extensions** and **Enlargement** of existing **Works** adapting them to the most **Improved** and **Modern Principle** of **Gas Manufacture.**

PURIFIERS, CONDENSERS, WASHERS, ENGINES and EXHAUSTERS, STATION METERS and GOVERNORS, manufactured and erected.

Makers, by permission of that eminent authority **Mr. GEORGE LIVESEY,** of his **CELEBRATED PATENT WASHER,** highly approved by all the Engineers of Works where adopted. Largely in demand.

Special reference and attention are invited to our

WET AND DRY METERS,

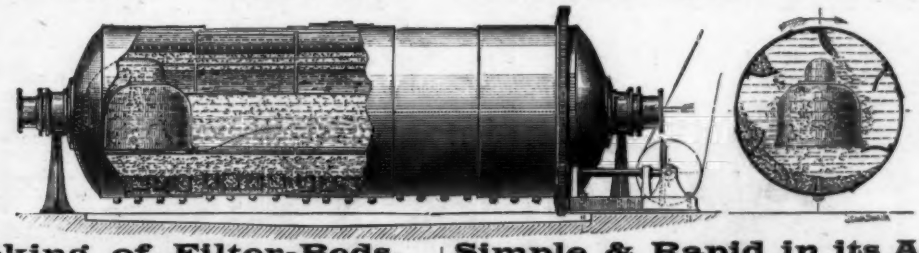
which have acquired a high reputation for the **excellence** of Materials and Workmanship; their **durability** and **accuracy** of **Register** guaranteed. They are used by several of the **London Gas Companies,** and over **200 Provincial Gas Companies.**

Price Lists, Specifications, and Estimates provided for any work appertaining to Gas Lighting, from the Retort-House to the Drawing-Room.

WATER PURIFICATION.

RIVER WATER and SEWAGE EFFLUENT successfully and economically treated in large volumes, by AGITATION WITH METALLIC IRON in

ANDERSON'S PATENT REVOLVING PURIFIER.



No Choking of Filter-Beds.
Colour due to Peat and Clay entirely Removed.
Simple & Rapid in its Action.
Organic Matter Considerably Reduced.
Microbes Totally Removed.

Made in Fourteen Sizes, capable of treating singly from **4000** to **1¼** Million Gallons daily.

REVOLVING PURIFIER COMPANY, LIMITED,

DOCK HOUSE, BILLITER STREET, LONDON, E.C.

CAST-IRON PIPES, ETC.

THOMAS SPITTLE, LTD.

[ESTABLISHED OVER 50 YEARS.]

CAMBRIAN FOUNDRY, NEWPORT, MON.,

MAKERS OF

CAST-IRON PIPES FOR GAS, WATER, AND STEAM.

ALSO

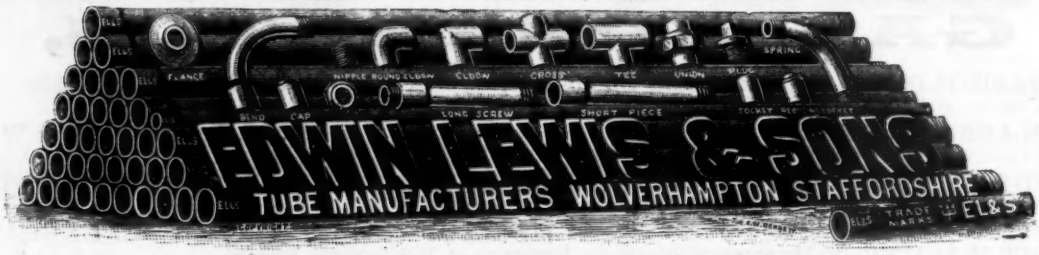
Retorts Mouthpieces, Lamp-Posts, Hydraulic Mains, H-Pipes, Dip-Pipes, Buckstaves, Ash-pans, Sight-Holes, Syphons, Ascension-Pipes, Fire Doors and Frames, Fire-Bars, Hydrants, Valves, Purifiers, Tanks, Columns, &c., &c.

ALSO ALL WROUGHT-IRON WORK.

THE LARGEST MAKERS IN WALES.

ESTABLISHED 1825.

GAS TUBES



MANUFACTURERS OF EVERY DESCRIPTION OF

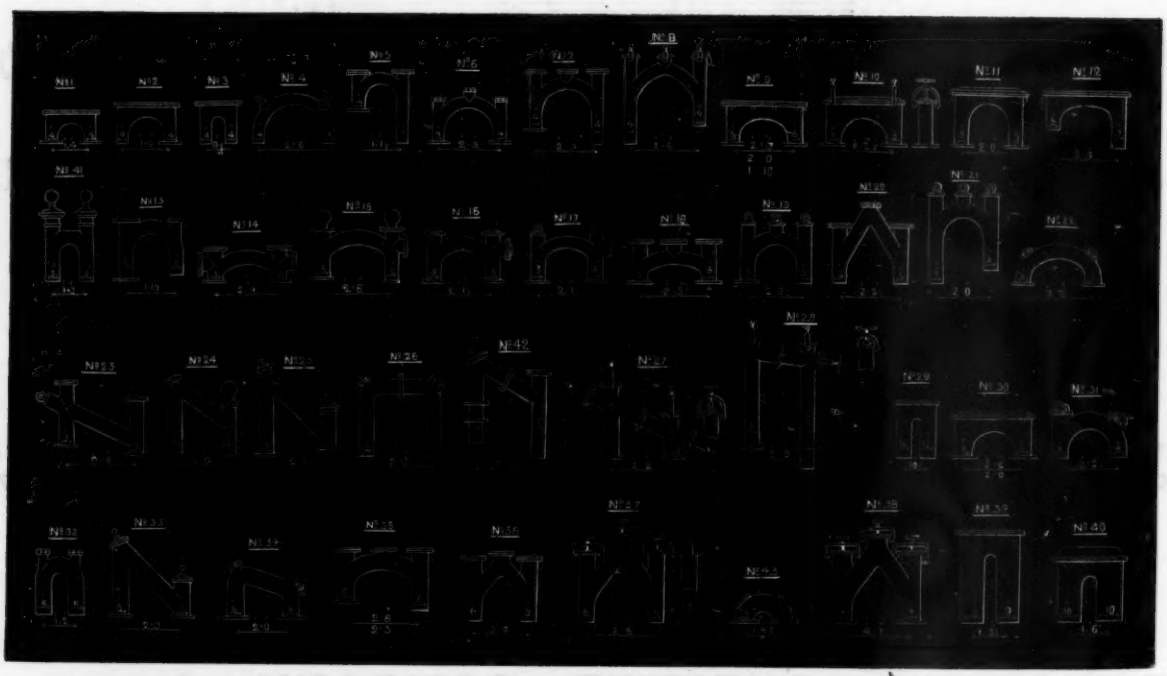
IRON OR STEEL LAP-WELDED OR BUTT-WELDED TUBES

FOR ANY PURPOSE.

R. & J. DEMPSTER,

Engineers, Ironfounders, and Contractors,

GAS PLANT WORKS, NEWTON HEATH, MANCHESTER.



ARCH, BRIDGE, OR H PIPES.

Any of the above patterns can be made with either flange or spigot ends and with faced flanges or turned and bored plugs if required.

Designs Nos. 26, 27, 28, and 42 can be altered to any desired span without extra charge. Other variations by arrangement.

Patterns for special designs or spans made to order.

JOSEPH CLIFF & SONS,

INCORPORATED IN
THE LEEDS FIRE-CLAY COMPANY, Ltd.,
WORTLEY, LEEDS.

LONDON Offices & Depôts:
Baltic Wharf, Waterloo Bridge.

WHARVES NOS. 2 & 4, INSIDE G.N. GOODS YARD, KING'S CROSS, N.

LIVERPOOL:
16, Lightbody Street.

LEEDS:
Queen Street.

MACHINE-MADE RETORTS

Have been made in large quantities for the last twelve years; and during the whole of that time, have been in regular use at most of the largest Gas-Works in the Kingdom. They possess the excellent quality of remaining as near stationary as possible under the varying conditions of their work—a quality which will be appreciated by all Gas Engineers and Managers. The generally expressed opinion is that these Retorts are the very best that are made.

RETORTS CAREFULLY PACKED FOR EXPORT.

Fire-Bricks, Lumps, Tiles, &c., &c., of every description suitable for Gas-Works.

ESTABLISHED MORE THAN A QUARTER OF A CENTURY

WORKS
HUNSLET,
LEEDS

LONDON OFFICE:
60, QUEEN VICTORIA
STREET
E.C.

CLAYTON SON & CO. LTD.

MAKE A

SPECIALTY

OF

GASHOLDERS,

AND
MAKERS
OF

REG? TELEGRAPHIC ADDRESS:
"GAS LEEDS"

GAS PLANT OF EVERY DESCRIPTION.

ROOTS' PATENT "ACME"

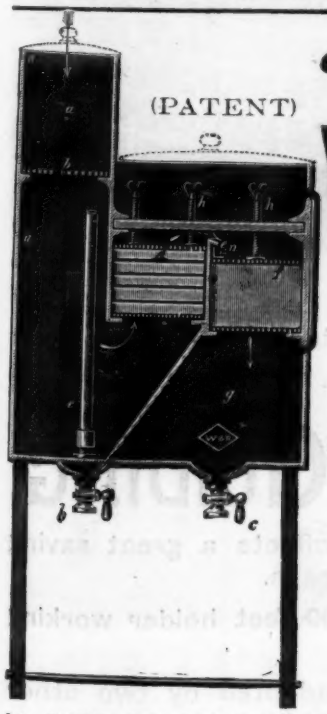
GAS EXHAUSTERS.

POSITIVE IN ACTION. SIMPLE IN CONSTRUCTION. DURABLE & SOLID IN DESIGN.

All Working Parts external and unaffected by Gas.

SOLE LICENSEES under Roots' Latest Patents,

SAMUELSON & CO., LTD., BANBURY, OXON.



THE

"Diamond"

(PATENT)

Waste Oil Filter

FOR

Purifying Refuse Oil and Grease, in Engine-Rooms, Boiler-Houses, &c.

PAYS FOR ITSELF IN A VERY SHORT TIME.

Used by

Stafford Corporation Gas-Works; L.B. & S.C. Ry. Co., New Cross; Union Bank, Ltd., London; H.H. The Maharajah of Mysore; Plymouth Works; &c., &c.

Prices and Particulars on application to

WOODHOUSE & RAWSON

UNITED, LIMITED,

88, QUEEN VICTORIA STREET, LONDON, E.C.;

41, PICCADILLY, BRADFORD; & CORNBROOK TELEGRAPH WORKS, MANCHESTER.

ASHMORE, BENSON, PEASE, & Co., Ld.,

GAS PLANT MANUFACTURERS,

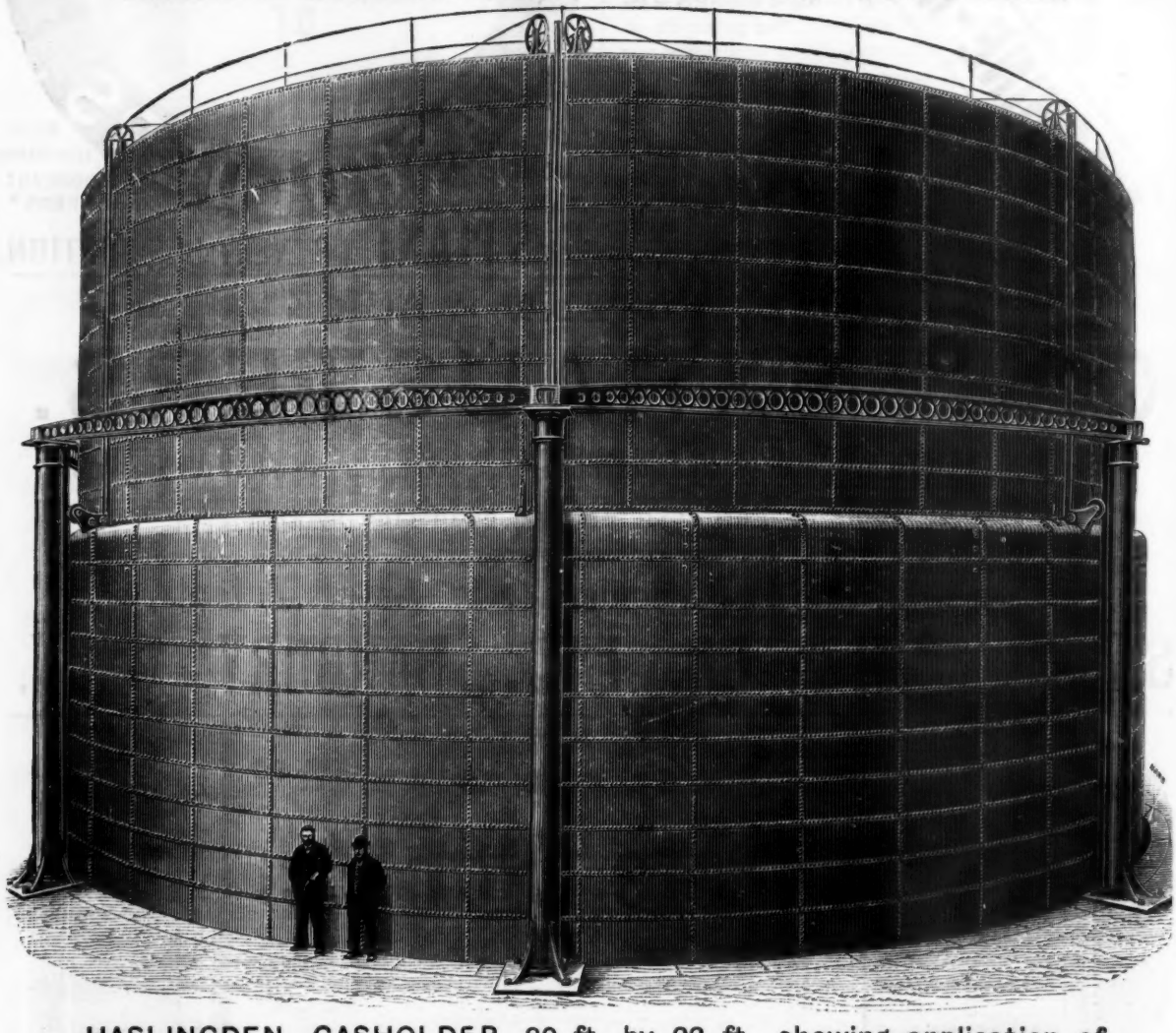
STOCKTON-ON-TEES,

SOLE MAKERS OF

DAVIS'S PATENT AMMONIA STILLS, which are the cheapest and most effective in existence.

Sole Makers of **GREEN'S PATENT SCREENS FOR SCRUBBERS.**

Makers of **SOMERVILLE'S PATENT DIP REDUCERS.**



HASLINGDEN GASHOLDER, 80 ft. by 22 ft., showing application of

PEASE'S

PATENT WIRE-ROPE GUIDING.

In adding second and third lifts to present holders, it effects a great saving in cost, and vastly increases the storeage.

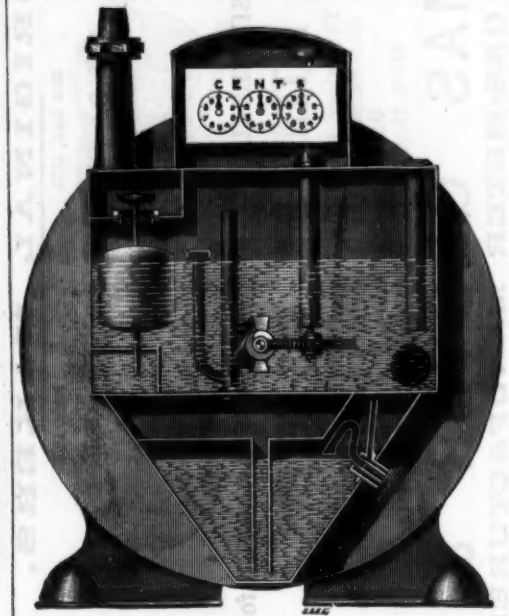
The Manchester Corporation have the third lift of a 100 feet holder working by this System.

PEASE'S WIRE ROPES have been also adopted by two other Companies for completely new telescopic holders.

THE SYPHON OVERFLOW

— Wm. Cowan's Patent. —

To suppose, as some do, that the main object of the "Syphon Overflow" is to promote the convenience of inspectors and others who "water" meters, is to misapprehend the chief purpose of the invention. That the convenience of inspectors is promoted by the Syphon Overflow is a fact that admits of no doubt whatever, because the watering of meters is thereby greatly facilitated; but it is a mistake to fix attention upon this result, and to regard it as the only one attained. To do this is to lose sight of the chief purposes the Syphon Overflow was designed to secure.



These purposes were—

1st.—The **speedy** attainment of **exactly the same water line** on each occasion of watering.

2nd.—The **absolute certainty** of this water line being attained.

3rd.—The **impossibility** of any water afterwards finding its way into the waste-box.

The first and second of these conditions secure the interests of the gas company, whilst the third greatly promotes the convenience of the consumer, for reasons that are well known.

Who that has had experience of Wet Meters does not know the disadvantages of the "Low Spout?" The slowness with which it adjusts the water line, and the patience required while this is being done, are matters of every-day experience. It is therefore no wonder that the "Syphon Overflow" is regarded as one of the most important improvements ever made in the Wet Gas-Meter. It is not only an important improvement **in itself,** but it possesses the property of making all previous improvements more valuable and effective. It has, indeed, made the Wet Meter a more perfect, and, in every way, a more satisfactory instrument.

Narrow views as to price often prevent the adoption of real improvements; but it would be a narrow view indeed which would prefer a "Low Spouted" Meter to one with a "Syphon Overflow," because of the trifling difference in the price of the two.

— W. & B. COWAN, —

— ESTABLISHED 1827. —

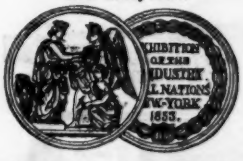
SMITH SQUARE WORKS, WESTMINSTER, LONDON, S.W. | DUTTON STREET WORKS, MANCHESTER. | BUCCLEUCH STREET WORKS, EDINBURGH.

ESTABLISHED 1844.]

ORIGINAL MAKERS.

[ESTABLISHED 1844.]

London, 1851. New York, 1853. Paris, 1855. London, 1862.



Dublin, 1865. Paris, 1867.

The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.
Since then we have not Exhibited for Prizes.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 to 222, ST. JOHN ST., CLERKENWELL GREEN, LONDON, E.C.

And at 37, BLACKFRIARS STREET, MANCHESTER.

TELEGRAPHIC ADDRESSES: "GOTHIC LONDON," "GOTHIC MANCHESTER." TELEPHONE No. 6725.

1st—Are a remedy for all the defects of Wet Meters.
2nd—Are suitable for all climates, whether hot or cold.
3rd—Incur no loss of Gas by Evaporation.
4th—Cannot become fixed by Frost, however severe.
5th—Are the most accurate and unvarying measurers of Gas.
6th—Prevent jumping or unexpected extinction of the Lights.
7th—May be fixed either above or below the level of the Lights.
8th—Cannot be tampered with without visibly damaging the outer case.
9th—Will last much longer than Wet Meters.
10th—Will not cost more than one-half for repair that Wet or Water Meters do.

Are upheld for five years without charge.

W. PARKINSON & Co.

MANUFACTURERS OF

DRY METERS

OF THE VERY BEST QUALITY.

The DIAPHRAGMS are of the Finest PERSIAN SHEEP SKINS.

The CASES are of the Best CHARCOAL-TINNED PLATES.

WET METERS,

With PATENT THREE-PARTITION DRUMS.

STATION METERS AND GOVERNORS,

PRESSURE & EXHAUST REGISTERS,

MOTIVE POWER METERS,

Test Gasholders, Experimental Apparatus, &c.

PRESSURE GAUGES OF EVERY DESCRIPTION.

NEW ILLUSTRATED CATALOGUE & PRICE LIST
Sent post free on application.

COTTAGE LANE WORKS, CITY ROAD,

LONDON.

Telegraphic Address: "INDEX."

BELL BARN ROAD WORKS,
BIRMINGHAM.
Telegraphic Address: "GAS-METERS."

OFFICE: 10, MAWSON'S CHAMBERS, DEANSGATE,
MANCHESTER.
Telegraphic Address: "PRECISION."

[See also Advts., pp. 371, 380.

CONTENTS.

EDITORIAL NOTES:— PAGE

GAS, LIGHTING, &c.—
The Chartered Meeting—A Vanished Hope . . . 343
More about Competition in Gas Supply . . . 344
The South Wales Railway Strike . . . 344
The Distribution of Heat . . . 345

WATER AND SANITARY AFFAIRS—
The Corporation Water Inquiry . . . 345
The Districts of the Metropolitan Water Companies . . . 345

ESSAYS, COMMENTARIES, AND REVIEWS:—
Gas and Water Companies in the Stock Market . . . 346
Electric Lighting Memoranda . . . 346
A Suggestion for District Associations . . . 347
The Responsibilities of Gas Companies who Undertake Gas-Fitting Work . 348

NOTES:—
Donkin and Kennedy's Boiler Tests . . . 349
A New Riveting Tool . . . 349
The New Dover Coal-Field . . . 349

TECHNICAL RECORD:—
North British Association of Gas Managers—Mr. L. Hislop on the Purchase of Coal . . . 350
The Connection of Lightning Conductors to Gas and Water Pipes . . . 351

REGISTER OF PATENTS:—
Refractory Lumps for Gas-Fires—Turner, H. C. . . . 352
Gas Cooking Stoves—Turner, H. C. . . . 352
Gas Ovens—Fletcher, T., and Clare, A. . . . 352
Ascertaining the Hourly Consumption of Gas by Burners—Fletcher, W. F. . 352
Gas Cooking Stoves—Micklethwait, W. H. . . . 352
Manufacture of Air Gas—Monier, J. F. L. . . . 352
Patent Notices . . . 353

CORRESPONDENCE:—
The Wire-Rope System of Gasholder Guiding . . . 353
Gasholder Construction . . . 353
Mr. Gadd's Gas Institute Paper . . . 353

PARLIAMENTARY INTELLIGENCE:—
House of Lords—Progress of Bills . . . 355
House of Commons—Royal Society Committee on Lighthouse Illuminants; Lighting the House; Progress of Bills . . . 355

LEGAL INTELLIGENCE:—
High Court of Justice—
Chancery Division—Benson *v.* Chandler and Others . . . 355
Queen's Bench Division—European Water Gas Company *v.* London and Colonial Finance Corporation . . . 355
Southwark County Court—The Liability of Agents and Owners of Property for Water-Rates . . . 356
Westminster County Court—A Claim for Water-Rates under an Agreement. 356

MISCELLANEOUS:—
Meeting of The Gaslight and Coke Company . . . 356
Meeting of the Brentford Gas Company . . . 358
South Metropolitan Gas Company—Directors' Half-Yearly Report . . . 359
Salford Corporation Gas Supply—The Annual Report of the Gas Committee; The Cost of the Strike . . . 360
Birmingham Corporation Gas Supply—The Gas Testing Question; Resignation of the Justices' Committee . . . 360
Competition in Gas Supply and its Results . . . 361
The Electric Lighting Scheme for St. Pancras . . . 362
The Water Supply of London—The Inquiry by the Corporation Committee. 362
Notes from Scotland . . . 364
Current Sales of Gas Products . . . 366
Gas and Water Companies' Stock and Share List . . . 366

PARAGRAPHS.—Mr. H. D. Ellis, 346—The Ohio Oil-Fields, 346—The Electric Lighting Scheme for Brussels, 346—The Croton Aqueduct, 346—Gas and Steam in the Same Cylinder, 346—Mr. H. M'Lauchlan Backler, 348—The Gas Pavilion at the Paris Exhibition, 348—The Issue of Additional Debenture Stock by the Lambeth Water Company, 349—Death of Sir John Preston, 349—Free Gas for Manufacture in America, 349—Mr. F. Thorpe, 350—Increase in the Salary of the Darwen Gas Manager, 350—The Use of Explosives in Well-Boring Operations, 350—A Reminder of an Old Invention in Gasholders, 350—Water in Queensland, 353—Dorchester Gas and Coke Company, Limited, 353—The Warrington Corporation Gas Accounts, 354—The Blackburn Corporation Gas and Water Accounts, 354—Colonial Gas Undertakings, 354—Dismissal of the Dronfield District Water-Rate Collector, 356—Grantham Gas Company, 358—The Lighting of Courts in Manchester, 359—Bingley Gas Supply, 359—York and the Bradford Water Bill, 359—Earls Barton Water Supply, 360—Grantham Water Company, 361—The Sewage Pollution of the Thames, 361—The Bristol Gas Company and the Gas Workers' Union, 361—Reduction of Meter-Rents at Oswaldtwistle, 362—The Claus Purification Process at Belfast, 362—The Saltley (Birmingham) Gas-Works Hospital Saturday Fund, 362—Proposed Extension of the Blackburn Gas-Works, 364—Proposed Extension at the Burnley Gas-Works, 364—The Northern Coal Trade, 364—Maidstone Gas Company, 364—The Spiral System of Guiding Gasholders, 365—The Lancashire Coal Trade, 365—Continental Union Gas Company, Limited, 366—The Capital of the Gravesend Gas Company, 366—Exhibition of Gas Appliances at Brixton, 366—New Joint-Stock Companies, 366—The Lincoln Corporation and Electric Lighting, 366—Ascot District Gas Company, 366—Lighting by Water Gas at Harrogate, 367—Proposed Adoption of Electric Lighting at Ilkley, 367—The Financial Results of the Liverpool Corporation Bill, 367.

TO CORRESPONDENTS.

No notice can be taken of anonymous communications. Whatever is intended for insertion must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

Telegraphic Address: "GASKING LONDON."

Telephone Number: 2730.

THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, AUGUST 12, 1890.

The Chartered Meeting—A Vanished Hope.

THE meeting of The Gaslight and Coke Company was held, as announced, last Friday. There was a rather poor attendance of proprietors, and fewer speakers than usual. Indeed, as will be seen from the report in another column, the only speeches delivered were those of the Governor (Colonel Makins, M.P.) and Mr. George Livesey. The proceedings were not long, when compared with the usual run of this Company's meetings; but they will be found well worth reading. It cannot be disputed, by anyone who was present, that the whole tone of the business was lugubrious. Colonel Makins laboured over his speech in a heavy style which is not usual with him; and not a gleam of his sardonic humour lightened the proceedings. He had to tell a tale of heightened expenditure and diminished receipts; and although he took particular pains to explain the latter—achieving partial success—his oratory fell remarkably flat. The Governor took up in painful succession all the points that we supposed last week would receive his attention. He said little upon the labour question beyond asserting that the Company are now upon good terms with their workmen; which, as the latter have had all their own way, is not surprising. With regard to the question of dividend, to which we alluded last week, the Governor stated that, having now advanced the price of gas, the Board were doubtful as to whether they could legally recommend the full rate of dividend under the sliding scale for the first half of the year, although the price of gas for the period in question would have justified it. Upon this point we can only say that the Commercial Gas Company have done more—they have actually paid an increased dividend for a half year, while the justifying reduction of the price of gas only operated for a single quarter. As, however, the Chartered shareholders are silent on the point, if not content, it is not for us to harp upon it.

A more serious matter, in regard to these proceedings, is the wrong assertion made by the Governor with reference to the question of damages between the Chartered and South Metropolitan Gas Companies, which brought Mr. Livesey upon his feet, and instigated him to fire a broadside into the Chartered administration which will echo for a long time to come. Colonel Makins deliberately stated—and did not withdraw the statement after it had been contradicted by Mr. Livesey—that overtures were made by the South Metropolitan Company, or by somebody acting on their behalf, for the relinquishment by the Chartered Company of their claim against the former Company for damages accruing in consequence of the notorious districting suit. This assertion was calculated to convey an erroneous impression of the true history of this phase of the case; and Mr. Livesey lost no time in repudiating, in a voice which vibrated with more emotion than he is accustomed to betray in his public utterances, the insinuation that his Company had ever come before the Chartered Board in the position of suppliants for money. Reference to the JOURNAL for Feb. 11 of the present year will set this matter right. We placed it on record that "three proprietors deprecated the exaction of "the 'pound of flesh' from the South Metropolitan Com- "pany;" the foremost of these being Mr. Jackson, a well-known Chartered shareholder, and Mr. Rokeby Price. Neither of these gentlemen was present last Friday to hear Mr. Livesey's narration of how their good will has entirely failed of its purpose. We acknowledged at the time that "Shylock was present" at the meeting in February; but our conclusion that it was "evi- "dently the sense of the meeting that the losers of the suit "should not be penalized," has not been, and could not be challenged. Mr. Livesey's own opinion of the result of the February meeting was freely stated at the subsequent meeting of the South Metropolitan Company. What all this actually amounted to was revealed by the proceedings before Mr. H. E. Jones, which, as we sorrowfully remarked at the time, demonstrated that the Shylock spirit rather than that of Messrs. Jackson, Price, and their sympathizers, had been adopted by those who conducted these proceedings for The Gaslight and Coke Company. The Governor on Friday promptly transferred to the shoulders of the Counsel employed all the blame for the haggling, which he could not deny; but although Counsel undoubtedly overlaid the issue with a good deal of superfluous matter, not expressed in a conciliatory manner, and hinted that what he insinuated was an unneighbourly motive on the part of the South Metropolitan Company might well be considered by the Referee when fixing the damages, he is certainly not responsible for the inflated figures put forward to support the Chartered claim, and rejected by the Arbitrator. It is idle for Col. Makins to protest his desire to keep friends personally and officially with Mr. Livesey, and also for the latter to reciprocate these amicable wishes, if somebody at Horseferry Road acts so as to turn

all such protestations into ridicule. Actions speak louder than words; and the net result of the Chartered proceedings in this regard has been to exasperate the relations between the personality of the two undertakings.

All this is very deplorable; but it is vain to deny the facts. What animosity between the London Gas Companies may mean is indicated by the concluding part of Mr. Livesey's speech, which must be described as devastating to the policy of the Chartered Board. The Directors' feelings, when Mr. Livesey told them before their constituents that they had paid 1s. 6d. per ton more for coal for next year than the two other Metropolitan Companies, may be inferred from the Governor's attempt to dispute the impeachment, which he did without refuting the charge. The proprietors generally listened in astounded silence to this attack, which would in all probability never have been made had Mr. Livesey not been goaded by the arbitration proceedings, and would possibly have had no occasion if the Companies had all taken counsel together at the time when we first exposed the machinations of the coal ring. Mr. Livesey complained bitterly of the lack of this concert in action, from which London gas shareholders and consumers would gain so much; and Colonel Makins, in reply, adroitly turned the complaint into a plea for a "gas ring," which Mr. Livesey immediately repudiated. The facts are notorious, however, as anyone ever so slightly conversant with the gas affairs of London can testify. Colonel Makins professed the greatest anxiety to act at all times in concert with the other Companies; but is it not true that the Horseferry Road idea of such concert is that, after the Chartered policy has been settled, the other Companies should be called in to support it? How many propositions for conferences of London Gas Companies have emanated from Horseferry Road which have contemplated untrammelled discussion; and how many have been designed to gain the appearance of union in support of a foregone conclusion? We cannot expect Colonel Makins or Mr. Phillips to give a categorical answer to this inquiry; but they are quite aware that it refers to proposals sufficiently modern and well known to serve as standards wherewith to measure the value of Horseferry Road conferences.

From all that has been said, it may be gathered that there was ample reason for the gloom that spread on Friday from the Directors' dais over the whole meeting, and flowed out at the doors as the proprietors walked away in disconsolate groups. The Board had a severe punishing from a strong man, who, but for sad mismanagement somewhere, might have been on their side. There could not be a greater contrast between any two meetings than may be drawn between that of Friday last and that held on Friday, the 7th of February. Then, everybody interested in London gas was rejoicing over the recent defeat of a mischievous conspiracy which would have converted a free employment into an odious tyranny; and those who knew that all had not been so pleasant as could have been desired between the Horseferry Road and Old Kent Road magnates, flattered themselves that a reconciliation was certain to be brought about as a tribute to the universal value of Mr. Livesey's victory, and that thenceforward the two undertakings would work out their respective destinies in harmony and friendly emulation. Now, this hope has proved illusory, by reason of the obstinacy, or narrow-mindedness, or simple foolery, of somebody, which has outweighed Colonel Makins's good-will and Mr. Phillips's better judgment. Unfortunately, the suffering and loss which such an unhappy state of things is certain to entail sooner or later, will not fall upon those who really deserve it.

More about Competition in Gas Supply.

LAST week we referred to an article (reproduced elsewhere in the present issue) by a well-known American Gas Engineer on the conditions under which the supply of coal gas is carried on in the United States. By way of completing the picture thus sketched in outline, we now give some remarks on "Municipal Gas Lighting" contributed to the *American Gaslight Journal* by a writer who desires to be known only as a "Citizen." In some respects at least it appears that the writer has no great reason to be proud of his quality of citizenship; for he admits that, so far as municipal government is concerned, the Yankee way of doing things is a sad failure. The very idea of surrendering gas undertakings to public management is held in abhorrence by the capitalists and professional men engaged in the business; whereas the politician class—"chronic feeders at the public crib"—see in such a transaction, whenever it is mooted, "more opportunities for a "division of the spoils and payment for services rendered "at elections." Taking the case of New York as an illustration, the writer observes that if the local gas and electric lighting undertakings were handed over to the municipal authorities, nobody doubts what the result would be, seeing that all the existing departments of the city service could be better administered at a saving of one-third of the actual cost. The whole subject has of late attracted an unusual degree of attention in the States, in consequence of the publication in the *Century Magazine* of an excellent account of the municipal management of Glasgow, which is held up to universal admiration. In this account the gas undertaking naturally comes in for due notice; and some Americans seem disposed to wonder whether they could not import some of the Glasgow results. To this reasonable desire the critic, who is himself an American citizen, objects that, in order to obtain the results, the means would likewise have to be imported; for there is nothing like them in the country. The first remark the native writer makes on this part of the *Century* article is that there must be in Glasgow "a "very different class of office-holders from what we have "in this land of universal suffrage, which, however good "in theory, is very bad in practice." Very remarkably, to a Briton, much of this difference is ascribed to the simple operation of muncipal disfranchisement for non-payment of rates, which puts practically the whole of the slum population outside the pale of self-government, and consequently renders them quite useless to the class of "ward politicians," supposing the genus to exist in this country, which Americans hardly admit. It is instructive, while the Socialistic press of the kingdom is shrieking for the grant of universal suffrage—or, as they put it, "the right of a man to a vote *quâ* man, and not as mere "householder paying rates"—to see how it works where they have it. Then again as to the men in authority, "the councillors of Glasgow come chiefly "from the ranks of business men, and are respected "and successful citizens. No salaries are attached to "such offices, and it is deemed an honour to be selected "to represent one's ward. Heads of departments are "selected with great care, and their places are practically "permanent." All this seems natural enough to us; but it is stated that in "glaring contrast to this class of managers "of municipal gas lighting would be the officers in charge of "the gas supply of New York, where two-thirds of the "Aldermen are interested in gin-mills, and all of whom hold "office for personal greed." Instances of American public interference in gas lighting are cited. The Philadelphia example is notorious. In the City of Hamilton (Ohio), the Municipality decided to set-up competing gas-works, and the Supreme Court, upon being appealed to, decided that the Gas Company has no rights which the Municipality is bound to respect, in the matter of competition; and this in face of the fact that the same authority may dictate the selling price to be charged by the Company. The end of all these contentions is that the Municipalities of the United States had better be restricted to their police duties; and it is hinted that any citizen would be justified in refusing, on the ground of unconstitutionality, to pay a levy intended to be applied by a Municipality to a trading purpose.

The South Wales Railway Strike.

AT the time of preparing this week's JOURNAL for the press, the whole country is watching with puzzled interest the progress of a remarkable strike of railway men in South Wales, which is having the practical effect of stopping the usual communication between the port of Cardiff and the coal-producing region behind it. The points in dispute between the men and their old employers are not at the present moment particularly clear. Originally the men pretended to strike for a working week of 60 hours; and although the employers now profess themselves willing to agree to this as a general rule, there is still division over a local matter of detail, and the parties appear hopelessly irreconcileable. If, as is reported, the only remaining difference between the employers and the men is as to whether during certain holiday seasons the working week should consist of 40 or 50

hours, the point scarcely seems sufficiently important to block the whole of the coal trade of Cardiff while awaiting the settlement that must come sooner or later. The peculiarity of the situation is that although the railway men actually on strike only number 1500 all told, by preventing the coal trains from running they are actually stopping many thousands of colliers, dock hands, and other labourers from working, besides inflicting immense inconvenience on the local public who are not directly concerned in the original quarrel. The immediate effect of the disturbance of the coal trade is, of course,to send up prices, so that Newcastle and Sunderland profit in some degree from Cardiff's loss. The South Wales employers as a body appear inclined to regard the railway strike as a preliminary skirmish which, if the men win, will lead to a general movement. On any other interpretation, it is difficult to understand why the trouble was not ended before it began, unless, as is stated, the whole affair is but an attempt to establish the supremacy of the Union. If this is the real point at issue, the employers may as well try first as last which are to be masters of their concerns, themselves or the Union officials. The local lights of agitation, having felt unequal to the task of managing the strike, have imported Mr. Ben Tillett to "general" them; and he is doing it with a vengeance. It is not a bright prospect for the community, when men of this stamp can be said to be better trusted by a body of workers than their natural local champions.

The Distribution of Heat.

THERE have been a good many projects for conveying materials of various natures—solid, fluid, and gaseous—through pipes laid in our streets; and many people think quite enough of these, for public convenience and safety, have been actually carried out in most large towns of the kingdom. There are gas and water mains, telegraph conduits, pneumatic tubes, hydraulic power mains, and electric light cables crammed together in narrow Cheapside and other much-frequented City thoroughfares, to say nothing of drains; and in some other places there are variants of these different classes of buried pipe and wire connections in the subsoil. From time to time these things give trouble of a more or less acute description, so that ratepayers, householders, and wayfarers are driven to wish that the roads could be left to their original use of enabling passengers to travel over their surface. We in England have been spared one infliction, however, which at this moment is vexing the souls of the people of New York. A short time ago a Steam Heating Company were permitted to lay their mains through the streets of that city; the belief probably being that experience gathered in small towns as to the distribution of steam for heating from a central station, would enable the work to be done without offence to the public. Experience has not justified this confidence. We recently had to record the havoc wrought among the multitudinous gas-mains of the city through the agency of the Steam Heating Company; and the Board of Health have since published a report upon the subject which makes its appear that the steam-pipes as laid are an unmitigated nuisance. New York is a warm place in summer; the temperatures in the manholes of the street subway for electrical wires being from 70° to 76° normally at this time of the year. In the Steam Company's manholes, temperatures of 162° have not unfrequently been registered. The temperature of the city water supply where it enters buildings is raised to 120° by the neighbouring steam-pipes, which also warm up to 170° cellars under the sidewalks. After this, it is not surprising to learn that asphalte pavements suffer damage, and that many other unpleasant consequences follow the failure of the Steam Heating Company to keep the heat they send out for public use in the channels provided for it. Truly, as we say, there is something to be thankful for in the reflection that public steam heating is not acclimatized in this country, and probably never will be. Such heat as residents in British towns require to be conveyed to their houses in pipes, instead of in the shape of solid fuel, can be most efficiently supplied by the Gas Companies; and gas heating has the advantage of being easily localized. If American householders do not like the trouble and dirt of coal fires, it is a pity they cannot come to terms with the Gas Companies for a service that would render steam heating less excusable than it now is as a Yankee "notion."

WATER AND SANITARY AFFAIRS.

IT was not any knowledge of the coming event which prompted our suggestion, on Tuesday last, that the Corporation Committee inquiring into the Metropolitan Water Supply might do worse than invite Sir Robert Rawlinson to appear before them. We presume the same idea presented itself to the Committee; so that on the day our remarks were published, the distinguished Engineer, formerly high in office at the Local Government Board, did appear and give evidence before Sir Guyer Hunter at the Guildhall. As we signified, we are not prepared to agree with all that Sir R. Rawlinson has to say on the water question; but, nevertheless, this gentleman gave the Committee some very useful information, accompanied by sundry practical suggestions. He was inclined to prefer hard water to soft, and cited various instances to show that cholera was not so intimately and invariably connected with the water supply as was generally supposed. The health of the people was more especially dependent on the general sanitary conditions under which they lived. As for the water supply of London, Sir Robert said that, with all its faults, it was far better than that of Manchester, Glasgow, or Liverpool. Thus Glasgow was again hit hard, as by Mr. Peregrine Birch a few days before. The Metropolitan Companies, Sir R. Rawlinson believed, had done their best according to their lights. Still he preferred a local governing body, representing the ratepayers; though he considered a Special Water Commission would answer the purpose better than the London County Council, which was an unwieldy organization. In order to improve the water supply, Sir Robert proposed something which appears to mean that the underground springs should be intercepted on their way to the river, so as to catch the water before it enters the bed of the stream. This is already being done to a certain extent, and would have been carried out still further if Parliament had not prevented the adoption of the scheme to which we have more than once referred, and which we may be pardoned for naming again. Another important witness before the Corporation Committee was Captain Shaw, the Chief Officer of the Fire Brigade. He was able to show that the Water Companies had exerted themselves loyally to meet his requirements in regard to quantity and pressure, and had given him twice as much as he asked for. In the case of the New River Company, the supply was four times what he had demanded. In the City he had found the fire hydrants of the greatest possible use. Results like these show the injustice with which the Companies were treated by the late Metropolitan Board, who would simply have nothing to do with them, and left them to struggle on with the hydrant question and other cognate matters as best they could, except that there was some little appreciation of hydrants in the last few years. General Scott also appeared before the Committee, and gave a quantity of valuable information, including a statement that the area supplied by the Companies included fourteen County Councils, besides 85 rural and 47 urban sanitary authorities. All these were said to have more or less control over the sources of the Thames and its tributaries. At the commencement of the sitting, some further evidence was given by Sir John Monckton as to his correspondence with the Water Companies on the subject of the inquiry. The attitude of the Companies towards the Committee is readily to be apprehended. They are prepared to appear before an independent and responsible tribunal, unbiassed in its views—characteristics which cannot apply to a Committee of the Corporation on this question. The Corporation have a quarrel with the Companies, and that is well understood. Even if it were otherwise, the Committee are without authority; and yet if the procedure is to be complete, there must be the same organization and expenditure as in appearing before a Committee in Parliament. This is a little too much to expect, although anything less would be a delusion. The Corporation Committee are now going to Manchester and Glasgow; and we hope they will be none the worse for it.

A new feature of considerable interest appears in the current report of the Metropolitan Water Examiner, General A. de C. Scott. A table is given, showing that out of a population exceeding 5,600,000 supplied with water by the London Companies, considerably more than 1,100,000

have their abode outside the Metropolitan boundary. The area of supply within the Metropolis is given as 121 square miles, while the extra-Metropolitan area is nearly 400 square miles. The New River Company have only 16 square miles within the Metropolis, as compared with 77 outside. The East London Company have 13·5 square miles within, and 66 without. In the case of the Grand Junction Company the ratio is still higher; being 6·5 against 40. The Kent Company have 30 miles within, and as many as 147 without. More than a third of the population supplied by the East London Company are outside London. The district of the Kent Company goes down beyond Orpington and Dartford, and that of the East London Company beyond Barking, Romford, and Waltham Abbey; while the New River district stretches away northward into Hertfordshire. Other districts reach to Hendon, Ealing, Hampton, Molesey, and Selhurst. Supposing the London Water Supply to be transferred to the London County Council, the jurisdiction of that body would, in all that concerns the supply, be extended over the whole of this extensive territory. The power and *status* of the Council would, of course, be proportionately increased, and the way would be prepared for an extension of the area now presided over for other purposes. The acquisition of the water supply means something more than revenue; and we can hardly suppose that the fact is unrecognized by so ambitious a body as that which occupies the "County Hall" in Spring Gardens. It is a curious circumstance that these outlying populations, amounting in the aggregate to one-fifth of the total, have practically no voice in the agitation now going forward in reference to the water supply. We should like to know whether the Corporation of West Ham feel an enthusiastic desire to have the water supply of their borough made part of the property of the London County Council? Another consideration has reference to the value of these undertakings, extending over so wide an area of town and country, and so constructed as to meet the constantly growing demand arising from the increase of the population in the vicinity of the Metropolis.

Mr. H. D. Ellis, the Secretary of the Commercial Gas Company, was last Tuesday elected Auditor of the London and Blackwall Railway Company.

The Ohio Oil-Fields.—Contracts have been given out by the Standard Oil Company for the construction of a second great pipe-line from the Ohio oil-fields to Chicago.

The Electric Lighting Scheme for Brussels.—Up to the 1st inst., four tenders had been received by the Brussels Municipality for the electric light scheme which it is proposed to carry out in the city. The first is a combined tender by Messrs. Siemens and Halske, the Allgemein Berliner Electricitäts Gesellschaft, and the Compagnie de l'Electricité de Liège; the second is by M. Patin, of Paris; the third, by MM. Ganz et Cie., of Buda-Pesth; and the fourth, by the Société Electrique of Brussels. We understand that no decision will be come to on these tenders until October next.

The Croton Aqueduct.—The new aqueduct to convey water to New York City was opened on the 14th ult. This great work, which has already been described in our columns, is rather more than 33 miles long, and will cost $25,000,000 before it is entirely completed. The flowing capacity is estimated at 318 million gallons daily. The construction of three new reservoirs is now going on; and they will increase the watershed storeage capacity to 20,000 million gallons. A fourth reservoir, to be started this summer, and the Quaker Bridge dam, will increase the capacity to 71,000 million gallons. When these works are completed, scarcity of water in New York, of which complaints were lately made, should be a thing unknown.

Gas and Steam in the Same Cylinder.—In a paper recently read before the Academy of Sciences, M. Tellier alluded to a new scheme for the provision of cheap power, by which he claims to be able to produce motive force by using a combustible gas, employing the heat resulting from its explosion to generate steam and the vapour of ammonia. When the gas has operated on the piston, it escapes at a temperature of about 400° into a generator, where steam is produced, which is used to act upon the opposite side of the piston from the gases. There are two advantages claimed for this. The high temperature due to combustion of the gas prevents cylinder condensation, and the steam assists in lubrication. The completed machine for which this claim is made will consist of two cylinders—one making its forward stroke under the action of the explosive gases, and its return stroke by the action of steam; the other being operated entirely by vapour of ammonia. Under these conditions, says M. Tellier, there can be no doubt, theoretically or practically, that 0·44 lb. of coal per horse power per hour is an economy which can be secured.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 366.)

By an unfortunate accident, our Stock Market article miscarried last week, and did not reach us in time to appear. In order to preserve the continuity of the record of market movements, it may now be briefly noted that depression in prices was the rule, owing to the Argentine revolution and a totally unexpected rise in the Bank rate to 5 per cent. Gas was quiet and dull. Gaslight "A" fell 3, and then remained steady at this reduction. The 10 per cent. preferences, however, rose 2. A lower rate of dividend declared upon ordinary stock is, of course, favourable to preferential charges; but a reduction of reserve balances, such as is now befalling the Company, is just the reverse. South Metropolitans receded. The market—so apathetic in another case—seems to have been astonishingly sensitive of the suggestion of a possible rise in the price of South Metropolitan gas conveyed in Mr. Livesey's exposition to his workmen of the mode in which their bonus must slide up and down with the price, as do the dividends. Buenos Ayres and Monte Video fell ½ each, owing to the local disturbances. Water was quiet and rather weaker; East London and Grand Junction going back a little.

Coming now to the week just completed, it has been a quiet period, without any feature of great interest. The Argentine settlement had a favourable tendency; but the holiday influences checked animation, and the two opposite forces were about equipoised. Business in gas was only moderate, and prices have not improved. The Gaslight and Coke Company's meeting was held on Friday. Nothing that then transpired, nor anything presented on the face of the accounts, leads us to modify what we said three weeks ago upon the Company's financial position. The Governor had not the most pleasant theme, and was perhaps least happy in his reference to the reduced rate of dividend. However, somebody gave 244 for the "A" on Saturday. South Metropolitans have been done steadily at rather better than average figures. The prices seem very high, considering what the return is. Commercials have hardly been noted; but the new stock is quoted 3 lower. There may be some reason for this; but we do not think any of this stock has gone about begging lately. There is nothing to say about Suburban and Provincial undertakings, except that the West Ham Company, the latest recruit to the sliding-scale ranks, have issued their first statement of accounts under the new system; and it is not cheerful reading. The Company adopted the singular course of lowering the price of their gas by 3d. per 1000 cubic feet as from the 1st of January, equivalent, *cæteris paribus*, to a drop of 8½ per cent. off the rental. To pay the fixed charges and the authorized dividend requires £13,870; they have earned £9680; and the deficit (£4190) will swallow up their net revenue balance with the exception of £1020. Truly this is not a large sum to have in hand, as times go now. The Foreign Companies generally are quiet and unchanged.

The daily operations were: Very moderate business in Gas on Tuesday, at the re-opening after Bank Holiday. Prices were only fair; but quotations kept up. Water was a blank. Wednesday was quieter still; but prices were a shade better. On Thursday there was rather more animation. Gaslight "A" was done at good figures; and South Metropolitan "B" was in some demand. On Friday, Gaslight "A" was done at wider prices—ranging from 245 to 242. South Metropolitan "A" was firm. Commercial new fell 3; and Pará, ½. In Water, Grand Junction was weaker. Saturday's business was extremely restricted; and, excepting an advance of 1 in Bahia, all quotations closed without further change.

ELECTRIC LIGHTING MEMORANDA.

The Affairs of the Edison and Swan Company—A New Theatre Installation—The Ferranti System—Strikers and Electrical Supply Companies—Execution by Electricity.

The Edison and Swan United Electric Light Company have held their seventh annual general meeting, under the presidency of Mr. J. S. Forbes. The Directors' report was very brief; merely stating that the business of the Company has resulted in a credit balance of £61,115, and proposing several ways for disposing of the money. These comprise the payment of a 7 per cent. dividend on the "A" shares, and a proportion of back preference dividends; leaving £8093 to be carried to the reserve fund. In his address to the shareholders, the Chairman professed to be embarrassed by not having anything to apologize for; in which respect he certainly occupied an unwonted position for the Chairman of an electrical undertaking. As the Company do not now engage in any lighting, but merely manufacture lamps for sale, they are better off than when they undertook to show the world what "the light of the future" was like. They have also been very fortunate in their litigation, the result of which has been to give them the virtual monopoly for incandescent electric lamps. It was acknowledged by the Chairman that the Company was for a long time in rather deep water; but he claimed that the reason for their deliverance was the action of the Board on the conviction that they had something worth fighting for. But for this confidence he confessed that

the rights of the Company might not have been upheld. A less partial observer might entertain the opinion that another element in the salvation of the concern from the bankruptcy that once threatened it was the bold abandonment of all lighting business from the moment when it was ascertained beyond doubt that this part of the Company's original programme could only be carried on at a ruinous loss.

Another illustration of the truth recently insisted on in these columns, that the cream of the electric lighting business in London is being skimmed by the larger private installations, such as that of the new police head-quarters, the banks, &c., is furnished by the published description in *Engineering* of the electric lighting plant for Mr. D'Oyly Carte's new theatre. This is precisely the kind of custom that the central electric lighting companies would like to secure, because it would come in very nicely after the principal shops and offices had shut for the day. However, the proprietors of these places are learning that they have nothing to expect from the large companies, and that such electric lighting as they require can be supplied from private plant under their own control far more cheaply than they can purchase it from street mains. When it is remembered how confidently it was once predicted that electric lighting would be cheapened as soon as amendment of the Electric Lighting Act had enabled large companies to get to work, the real significance of these private installations becomes apparent. The last new theatre-lighting plant is described as very large and complete. It comprises three Willans compound 135-horse power engines, supplied with steam by as many locomotive boilers working at a pressure of 140 lbs. per square inch. The dynamos are driven directly from the engines, giving an output of 650 ampères at an electromotive force of 110 volts. Two sets of storage batteries are added to this plant for day use. Fans driven by electro-motors are employed for the ventilation of the house. The whole installation has been carried out by Messrs. B. Verity and Sons. It can be readily imagined that the frequently appearing descriptions of these private electric lighting plants must be extremely unpleasant reading for the partisans of central lighting stations.

Our contemporary, the *Electrical Review*, not without a certain amount of glee, prints a report that some of the Ferranti mains from the Deptford station have gone wrong once again, and necessitated the tearing up of the streets where they have been laid. It is remarkable how slowly this particular system is being worked out. The Deptford station was to have been started last autumn; but, for all that can be gathered to the contrary, it may be considered doubtful if it will really be ready by the coming winter. The Ferranti mains, which were supposed to be perfectly adapted for the conveyance of the alternating currents of enormous potential intended to be generated at Deptford for the service of the whole of London, do not seem to improve on closer acquaintance. As may be remembered from our former references, these mains are concentric copper tubes, with the annular space filled with insulating material, and the outer tube is intended to carry the outflowing, while the inner is for the return current. It is contended, therefore, that they must be perfectly safe in action, because the leakage of current, if any, would be inward, from the outer to the inner tube, and could not therefore escape to surrounding objects. This idea is correct, doubtless; but the tubes cannot be made endless, and it is understood that trouble arises at the joints. Opponents of the Ferranti system aver that the mains are bad things to buy, because most of their cost is for the making, and therefore they do not represent a redeemable asset. On the other hand, the companies that employ solid copper bars merely resting on porcelain supports in dry trenches, without insulation of any other kind, always have the copper, which their use does not damage. The cost of their mains is consequently the expense of laying, and the interest on their value; and they never wear out. These are points of electrical engineering practice which experience will settle within the next few years.

It should not be forgotten that labour troubles are as likely to affect the electrician as the gas maker; but a statement made by Mr. Gray, the Managing Director of the India-Rubber and Gutta-Percha Company, respecting the consequences of the recent strike at the Company's Silvertown works deserves to be committed to heart by all observers of the work of John Burns and other agitators of the same order. The Company had not the advantage of sufficient police protection at the first, or the strike would have been checked at once, instead of running on as it did for twelve weeks. However, it so happened that, having works in France, the Company were able to fulfil their contracts without appreciable loss to themselves; while the sacrifice of wages by the strikers amounted to £20,000. After this, the failure of the Silvertown agitators looks bigger and blacker than ever; for it can be seen that, although they can neither prevent the manufacture of electric light cables nor the supply of gas in London, they can easily inflict irreparable loss upon their dupes.

Although it is not a matter that we are desirous of discussing, the horrible incidents connected with the first, and it may be hoped the last, execution of a criminal by electricity must be briefly noticed, as they have greatly impressed the public mind during the past week. We recorded some time ago the fact that the State Legislature of New York had adopted electricity as the means of carrying out capital punishment, and that a subject was actually awaiting the fantastic experiment, which was delayed for a variety of legal and technical reasons. The State laws of America seem to permit of the prolonged exhibition of the tortures of a condemned criminal, as was shown to a scandalized world in the case of Guiteau. The case of Kemmler, however, is more scandalous still; and the conscience of the civilized world revolts against the sensationalism and quackery that has disgraced New York in regard to this deplorable incident. With a ghastly repetition of its uncertain behaviour on other occasions, the electricity refused to act in the way desired when Kemmler was to be killed with legal and scientific formality, although it has succeeded in destroying life with both completeness and dispatch when this result was neither intended nor desired. The whole affair from beginning to end has been discreditable to the science, sense, and humanity of the American people, in whose name this outrage has been perpetrated.

A SUGGESTION FOR DISTRICT ASSOCIATIONS.

JUST at this season of the year, there is usually a lull in the business of the various technical societies devoted to the gas lighting industry. True, the North of Ireland Association are actually meeting at Newry as these lines are being printed; but this is the exception that proves the rule. Gas engineers have other matters in hand at present besides the writing of papers. Some are in the full stress of their extensions and renewals for the year, and have their works overrun by strange men who occasionally give a considerable amount of trouble. Where the permanent works' staff is small, a large irruption of contractors' men—who are too often in chronic want of odds and ends that can be picked up in the shops if nobody happens to be looking—commonly causes annoyance to the regular hands. It is difficult to always keep the two sets of workmen apart; and the poor manager in a small way, with nobody to help him, often feels that summer a burden in which large extensions have to be effected. Other managers are so fortunately situated as to be able to take their holiday at the same season that the majority of the community have selected for this purpose; and consequently think if they glance through their JOURNAL, that they are doing enough for technical literature. The District Association meetings will be resumed in due course, however; and it is desirable that they should be provided for in ample time. With this intention we have a small suggestion to offer that may or may not recommend itself to the Presidents, Secretaries, and Committees of these Societies, but which at any rate will not hurt them to consider on a convenient opportunity. It is well known that the Committee of the North British Association of Gas Managers undertake a certain amount of labour of a statistical nature, in collecting and publishing returns relating to the Gas Supply of Scotland. What we now suggest is that the District Associations throughout the country should likewise undertake an annual technical stock-taking for their own particular areas, with the difference that the facts to be collected should be of an engineering rather than a purely statistical class. For instance, at a stated period of every year, all the members of the Association who had done any extensions of plant, or any renewals beyond the merest refurnacing, &c., should place upon record in a succinct form the work they had achieved, with such particulars as might be considered likely to instruct their colleagues and illustrate the contemporary development of practice in the neighbourhood. If, for example, Mr. Blank, of Anyborough, has only had occasion to put in a new boiler, he might record its kind and performance, so that if it happens to be a Lancashire boiler it might be compared with another manager's fancy for a water-tube boiler. New washers and purifiers, again, would indicate the course of local development, and show what types of such appliances happen to be fashionable. So again with gasholders and tanks; brief particulars of the designs adopted, and the cost of the additional storeage provided, would often be most instructive, and would always be worth the trouble of preparing the few lines of description necessary.

The idea is, in short, to secure a record, which might often serve as the basis of interesting discussions, of those ordinary constructions which occupy so much of the thoughts and time of most gas managers while they are in hand, and yet do not furnish points of novelty of sufficient saliency to justify their being made the subjects of long papers. Under the existing arrangements, these objects of the gas manager's care altogether escape the attention of his colleagues, unless they happen to visit his works. Yet it is often acknowledged that the most agreeable and instructive visits of inspection are those which are paid to works that would not furnish material for a regular paper. General intelligence can be, and often is, displayed in a works which in every detail is merely commonplace. Originality is not always desirable, even if it were attainable; and an engineer frequently shows his good sense by frankly copying another in a successful device or arrangement.

If this suggestion were carried out, we should have a record in a given district of so many gasholders, so many washers, sulphate plants, retort-houses, and so forth, constructed during the year. Such constructions as embodied any novelties would be duly remarked; while as to others, if they showed nothing

extraordinary in design they would still be evidence of the prosperity of their owners and of the good sense of their builders. If such a contrast should be disclosed as that of a gasholder and tank in one place costing half as much again as a similar work elsewhere, some good would come of comparison. If matters preserved, on the contrary, a recognizable uniformity, it would be something to know what storeage could be provided for in any given locality. The same remark applies to purifying and carbonizing plant. In this way districts where lime is employed would be distinguished from oxide counties; and shovel charging would show its divergence from scoop work. A great deal that is very much a matter of routine in one locality is new to another neighbourhood; and such a record as we have in contemplation would reflect local practices.

It must be borne in mind that in gas manufacture, as in all other extensive occupations and interests, it is not the striking novelties and dazzling departures from established usage that truly represent the contemporary condition of the industry. It is conceivable, for example, that any District Association of Gas Managers might discuss at their regular meetings such matters as guideless gasholders, fluid purification, and inclined retorts; and yet not a member might have actual experience of one of these things. Which would be the more correct and really instructive presentment of gas affairs in that district—the idealized talks about what none of the speakers understood, or the statement of what these speakers were actually doing at the time? Information such as we are discussing would disclose the true state of the gas industry in the district concerned for the time being, which is wholly concealed by the usual system of papers relating to novelties and developments over the heads of the majority of the gas managers representing the district. It would go far towards breaking down the artificiality which is one of the few besetting vices of these Associations, where every man comports himself as a critic of the communications and addresses submitted to him; whereas it is what a man does rather than what he says which should establish his measure in the estimation of his contemporaries.

It may be objected that returns like those in contemplation, in order to be complete, would have to give such details as would convert them into advertisements of contractors. This is an objection that may very easily be exaggerated. If a firm of contractors carry out a piece of work to the satisfaction of the engineer, there can be no reason against the publication of their names in connection with the undertaking, especially if it is of such a nature that the reputation of the contractors is closely identified with the work in question. Thus it is clearly unnecessary that one builder or machinist should be advertised more than another for carrying out an order that anybody in the trade could have executed equally well. At the other extreme there are specialities which cannot be named without at the same time advertising the contractor's business; but in this case it cannot be helped. Between these extremes lie many works in connection with which the naming of a contractor must remain a matter of taste and sense of fairness.

Such as it is, however, the suggestion is made with a view to increasing the value of District Associations of Gas Managers, and adding to the already available means for taking stock of the condition of the gas industry in this country. In the United States something of the kind is done, very partially and to no very good effect, by the newspapers, which habitually procure from different gas managers returns of what they oddly call the "betterments" carried out by them year by year. The utter absence of anything like system and the sense of proportion from these reports would be corrected if a technical society undertook the duty of collecting the same kind of information. If the task were a difficult or an arduous one, we should not desire to see it added to the responsibilities of the Honorary Secretaries of our District Associations; but it would probably be neither the one nor the other if the scheme of collection were settled in the first place by the Committees. The idea appears at least to be worth further consideration.

Mr. H. M'Lauchlan Backler, at an extraordinary meeting of the European Gas Company held yesterday, was presented by Mr. R. Hesketh Jones, on behalf of the shareholders, with a beautifully illuminated address, and a cheque for 1000 guineas. A report of the proceedings will appear in our next issue.

The Gas Pavilion at the Paris Exhibition.—Those of our readers who visited the Gas Pavilion in the grounds of the Paris Exhibition last year will be specially interested in an elaborate *brochure*, containing an illustrated description of the building and its contents, which has been issued (we presume under the auspices of the Committee under whose supervision the Pavilion was erected and furnished) by M. Glucq, of Paris, and of which copies have been courteously presented to us by M. Ellissen, the Chairman of the Committee. The letterpress and illustrations are executed with the excellent taste for which our neighbours are celebrated; and these are accompanied by a reproduction of a photograph of the building and its surroundings. The work is not only a capital *souvenir* of this particular section of the Paris Exhibition, but forms a permanent record of an important event in the history and development of the gas industry. The book is to be obtained at the office of the *Journal des Usines à Gaz*, No. 65, Rue de Provence, Paris, at the price of 5 frs.

THE RESPONSIBILITIES OF GAS COMPANIES WHO UNDERTAKE GAS-FITTING WORK.

The case of *Scanes v. The Exeter Gas Company*, which was briefly alluded to a fortnight ago (p. 264), is of considerable interest as showing the responsibility attaching to gas companies and others who undertake the supply and fixing of gas-fittings.

The facts are as follows: Mr. Scanes rents Nos. 16 and 17 in Cathedral Yard, Exeter, and carries on the business of a bookseller, law stationer, and servants' registry office in the shops, sub-letting the remainder of the premises as offices. The first floor of No. 17 is let to Mr. Perkins, the City Analyst, and the second floor to Mr. Harvey, a barrister. The premises are somewhat small and cramped; and the entrance to Messrs. Perkins and Harvey's offices is by means of a side door communicating with a narrow and winding staircase. Early in January last an order was sent to the Gas Company to fix a bracket for the lighting of this staircase, and a gas-fire in Mr. Harvey's room. A man named Lockyer, one of the gas-fitters employed by the Company, was accordingly sent to carry out the work. The service supply pipe is brought in near the side door; and just inside there are two meters, fixed in the usual way, from one of which a perpendicular pipe is carried up in the angle of the wall, for the supply of the upper part of the house. Mr. Scanes instructed Lockyer where the bracket (which was to be taken from an upper landing, where it had hitherto been used) was to be fixed; and he also showed him the rising pipe from which the supply of gas was to be taken. Apart from the rising pipe, however, there was a horizontal compo. pipe crossing it at right angles. The pipe was not let in flush, but was covered with paper in common with the rest of the wall. Lockyer, finding that this horizontal pipe extended to within about 6 feet of the place where the bracket was to be fixed, joined his pipe on to it at the nearest place—probably supposing that it was connected to the rising pipe. Finding that he could not get any gas at the bracket, he saw Mr. Scanes about the matter; and he afterwards traced the horizontal pipe to the point where it crossed the rising pipe. He then discovered that the two pipes were quite independent—the one passing behind the other. He cut the horizontal pipe, stopped one open end, and joined the other into the rising pipe by a saddle-joint; thus securing the gas supply for the bracket. But this horizontal pipe, to which the bracket supply had been connected, passed on beyond that connection through a partition and into another room.

It may here be explained that the horizontal pipe had been in position for many years, and had been cut off and left disused some time ago, no one appeared to know when; and also that it had been cut off on the other side of the partition, and the end left open. From the fact, however, that the room in question was used by Mr. Perkins as a photometer room—being fitted with an Evans photometer of the usual pattern—it is probable that this pipe had been laid at some time for the supply of the photometer. Lockyer did not look to see if the end of the pipe was stopped properly; and the only reason he gave in evidence for not doing so, was that the door was closed. Perhaps, knowing the purpose for which the room was used, he thought that everything would be all right in there. Anyway, he does not appear to have either looked himself, or to have asked anybody else about the end of the horizontal pipe. His omission to do this was the first factor in the accident which subsequently happened; and this was alluded to by Mr. Justice Mathew in his summing up, as an act of either negligence or incompetence, for which his employers were to be held responsible. Lockyer completed the order on the 9th of January, and the gas was used on the premises for a short time in the evening, but was turned off at the meter for the night. On the following day a smell of gas was noticed, and Lockyer was sent for. He came and tested his own work; but again he appears to have been utterly oblivious about the continuation of the old pipe, which he had utilized for the supply of the bracket. After giving some intimation to Mr. Scanes that it was all right, he left. On the morning of the next day, Mr. Perkins complained to Mr. Scanes about the escape of gas; and the two went into the photometer room, where they found the open pipe and the gas escaping. Mr. Scanes fetched a chair, a hammer, and a pair of pincers, with the intention of closing up the pipe, which was situated in the angle of the wall and ceiling of the room, which is both small and low. Mr. Perkins meanwhile was directing his attention to the photometer. Mr. Scanes got his tools and mounted on the chair to reach the end of the pipe, when Mr. Perkins lit a match. Why he did so, did not appear. He was about to explain something about it in the course of his evidence; but Counsel for the plaintiff stopped him with the jocular remark that "he did not want to know anything about the photometer," and so the matter passed. A violent explosion followed; hurling Mr. Scanes from the chair, and burning him severely on the hands and face. The room was much damaged, and the detonation was heard in the neighbourhood, sufficiently to bring together a crowd of people. From the fact that Mr. Perkins escaped unhurt, and that he struck the match near the photometer in the lower part of the room, it seems likely that an explosive mixture of gas and air had accumulated in some of the recesses of the photometer; and that this being ignited first, fired another and larger mixture near the

ceiling. Mr. Scanes stated that a noticeable time elapsed between the first appearance of the flame, and the shock that threw him from the chair.

Counsel for the plaintiff dwelt largely upon the loss of business, the suffering, and the extra expenses that had been experienced by Mr. Scanes; and he claimed that the explosion was really due to the negligence of the man Lockyer, whom he alleged to be both inexperienced and incompetent as a gasfitter, as was shown by his actions throughout the matter. Counsel for the Company urged that there was contributory negligence on the part of the plaintiff; the fault was not in any of Lockyer's work; and if the plaintiff had, immediately on discovering it, turned off the gas at the meter and sent for a gasfitter, the explosion would not have happened. The best witness for the plaintiff, however, was Lockyer himself. He said that his experience with regard to old pipes cut off and left in position, was that the ends would be stopped in eleven cases and left open in the twelfth. He endeavoured to put upon Mr. Scanes the responsibility for all he had done; and this was turned to excellent account by plaintiff's Counsel, as a proof of incompetence, by drawing the inference that he was obliged to ask Mr. Scanes about everything before doing the work. It was elicited in cross-examination that he had only been employed by the Exeter Gaslight Company for a year and eight months; and that previously he was a brass finisher, but had had no experience as a general gasfitter. The most telling point, however, was the fact that in taking off the bracket on the upper landing, he had left a piece of gas-pipe in position with the end open. It was only a piece about 2 feet long; but the plaintiff's Counsel was able to make a great deal of the fact.

Only a few weeks since—see Vol. LV., p. 1180—we directed attention to the responsibility incurred by gas companies in undertaking to supply and fix gas-fittings; and the case here alluded to, in which a judge and jury decided that the Exeter Gas Company were liable for the act of their workman, Lockyer, in neglecting to see that the end of an old pipe was properly stopped, is a striking commentary upon the remarks then made. We pointed out the desirability of systematic inspection of each job by some responsible official, instead of leaving the whole of the work to the care and discretion of the average gasfitter. Such an inspection would have prevented this accident, with its deplorable consequences. Whatever the legal aspect of the question may be, it is impossible to leave the matter without a comment upon the real cause of the explosion. Mr. Perkins, as an Analyst and Gas Examiner, might be supposed to have a fair acquaintance with the properties of coal gas. And yet, with the knowledge that a considerable quantity of gas had accumulated in the room, and was still rushing out through the open pipe, he seems to have behaved with the utmost indifference. Did he recommend turning off the gas? Did he even open the doors and windows, to let in as much fresh air as possible? No. He struck a match. With such an example of the action of an educated gentleman before us, can it be a matter of surprise if the working gas-fitter is occasionally negligent?

The Issue of Additional Debenture Stock by the Lambeth Water Company.—The Directors of the Lambeth Water Company have allotted the £35,000 of additional 4 per cent. debenture stock, for which tenders were received last Tuesday, at prices varying from £123 5s. to £125 per cent.; the average being £123 11s. 7d. The minimum price fixed was £123.

Death of Sir John Preston, of Belfast.—We regret to record the death, on Monday last week, of Sir John Preston, ex-Mayor of Belfast, and Chairman of the Gas Committee of the Corporation. The deceased gentleman was one of the leading linen merchants of Ulster, and took a prominent part in all local political movements. The honour of knighthood was conferred upon him in 1888. In the chairmanship of the Gas Committee he succeeded the late Sir John Savage in 1883; and is himself succeeded by the Mayor (Mr. C. C. Connor). At the meeting of the Belfast Corporation last Tuesday, sympathy was expressed with Sir John Preston's family in their bereavement.

Free Gas for Manufactories in America.—There is a movement on foot in Indianapolis, says the *American Manufacturer*, to provide practically free fuel gas for manufacturers who are located there, and to induce others to come to that city. The plan, as originated by Mr. C. M. Cooper, of that city, and which has elicited considerable earnest discussion, is, in detail, as follows: It is proposed that the city should issue bonds to the amount of $500,000, payable in 20 years, and drawing 4 per cent. interest; the money raised on these to be expended in procuring and developing gas territory and bringing the gas to the city. Manufacturers are to be furnished with gas at a rate just sufficient to cover the running expenses of the plant and a stated payment on the bonded debt each year, the amount of which is calculated by Mr. Cooper thus: Interest on $500,000 at 4 per cent., $20,000; current expenses, (say) 4 per cent., $20,000; 5 per cent. to pay on principal, $25,000—total, $65,000. By the arrangement at present in force, some of the Indianapolis manufacturing establishments are paying nearly $160,000 per annum for gas supplied by the Consumers' Trust and Indianapolis Companies. The plan as outlined will, it is claimed, offer a great advantage, as the Companies named will then be enabled to meet a wider demand from the private consumers.

NOTES.

Donkin and Kennedy's Boiler Tests.

The second of the series of steam-boiler tests conducted by Mr. Bryan Donkin, jun., and Professor Kennedy, F.R.S., to which reference has already been made, was on a nearly new Lancashire boiler, regularly used to produce steam for Messrs. Donkin and Co.'s Bermondsey works. It is 21 feet long and 7 feet in diameter, with two 2 ft. 9 in. flues, each fitted with three Galloway tubes. The furnace is provided with Perret's patent grate for burning breeze and other low-class fuels. The standard coal set apart for these trials was used. The experiment lasted nine hours. A mean steam pressure of 50 lbs. above the atmosphere was maintained. The evaporative duty was at the rate of 9·92 lbs. of water, from and at 212° Fahr. per pound of coal as burnt, or 11·34 lbs. per pound of coal pure and dry. Analysis of the dry furnace gases showed 13 per cent. of carbonic acid, no carbonic oxide, 11·15 per cent. of oxygen, and 75·85 per cent. of nitrogen. The temperature of the furnace gases at the base of the chimney was 399° Fahr. The balance-sheet of the trial shows that of the heat of the pure and dry coal, 70·4 per cent. went into the water, 13·6 per cent. into the furnace gases, 7 per cent. in radiation, 3·4 per cent. in evaporating the water under the Perret grate, and 4·9 per cent. was unaccounted for. The rest is in fractional losses. A third experiment, on the same boiler, with forced firing and a steam pressure raised to 57 lbs. above the atmosphere, 256 lbs. of coal being consumed per hour instead of 135 lbs. as in the former experiment, resulted in an evaporative duty of 10·02 lbs. of water per pound of coal, from and at 212° Fahr.; the equivalent evaporation per pound of coal pure and dry being 10·90 lbs. In this case the carbonic acid in the furnace gases went up to 18·21 per cent., and there was 0·24 per cent. of carbonic oxide. According to the balance-sheet, 67·6 per cent. of the heat of the fuel went into the water, 16·2 per cent. into the furnace gases, 6 per cent. in radiation, 4·6 per cent. in evaporating water under the grate, 1·2 per cent. lost by imperfect combustion, and 3·6 per cent. was unaccounted for.

A New Riveting Tool.

A distinct advance should be marked in gasholder erection, especially in foreign parts where skilled labour is not obtainable, by the invention of the pneumatic riveter and caulker, which is made by the American Pneumatic Tool Company, of New York. This implement does not appear to be anything more than a special development of the pneumatic drill, which has long been successfully employed in rock drilling and tunnelling. It is a device whereby air power, compressed to anything between 10 lbs. and 50 lbs. per square inch, is made to drive a reciprocating piston carrying any required tool in its head, which strikes a great number of light blows very rapidly, while the tool is pressed by hand against the face of the work. Exteriorly, the tool somewhat resembles an automatic gas-lighter, with the connection for the air-pipe at the back end. It consists of a cylindrical case containing the actuating piston, which on its outward stroke strikes the rivet, and on its return is cushioned by the compressed air which drives it. The tool is obviously susceptible of a number of varied applications; but it is said to be peculiarly adapted for light riveting, and, in the hands of an expert workman, will do the work of three or four riveters. A pattern is made for boiler and heavy iron-work riveting, and it is well spoken of by American locomotive erectors. If it is good for anything at all, it should be a boon to gas managers situated at a distance from any gasholder yard, by facilitating repairs to sheeting, &c., by the aid of local labour only.

The New Dover Coal-Field.

A lecture on the search for coal in the South of England was recently delivered at the Royal Institution by Professor W. Boyd Dawkins, F.R.S., in which the facts relating to the discovery of coal at Dover were expounded. The seams of coal are proved by the surface-soil, traversed by roots to which in some cases the trunks are still attached, to have been formed *in situ* by the growth and decay of innumerable generations of plants, including pines and a vast undergrowth of ferns, all of which contributed to form a peat-like mass. Horizontal at first, the coal-seams, with their covering strata forming the carboniferous series, were thrown into a number of folds by earth-movements and buried. Mr. Prestwich has called attention to the physical identity of the coal from Somersetshire and France and Belgium; and expressed the opinion that coal of the same class underlies the region separating these English and foreign fields. The boring at Dover goes to a depth of 1180 feet from the bottom of a shaft 44 feet deep. The coal measures were struck at a depth of 1204 feet from the surface; and a seam of good blazing coal was met with 20 feet lower, or well within working depth, seeing that the principal coal-pits in this country are worked at depths ranging from more than 1000 to 2800 feet, and one at Charleroi is worked to a depth of 3412 feet. The Dover coal-field, according to Professor Dawkins, probably forms part of the same narrow trough as the Calais measures. Whether it is a long trough, or a small, faulted, insignificant fragment of a field, such as that of Marquise and Hardinghen, remains to be proved. It is, however, one of a chain of coal-fields which, in Professor Dawkins's opinion, will be proved to extend under the newer

rocks between Dover and Somerset, along the line of the North Downs, in long narrow east and west troughs. The further question as to the value of these fields may be answered by the amount of coal in the fields now being worked in Westphalia, Belgium, France, and Somersetshire. The Westphalian coal-field contains 294 feet of workable coal, distributed in 117 seams; that of Mons, 250 feet in 110 seams; and that of Somerset, 98 feet in 55 seams. The North French coal-field in 1887 yielded 7,119,633 tons, and gave employment to 29,000 pitmen. Professor Dawkins thinks that the necessary base has now been laid down for further discoveries in the Dover field, which in all probability will restore to South-Eastern England the manufactures that have long since fled away to the North, and which will put off by many years the evil day when the energy stored up in the shape of coal in these islands shall have been spent.

Mr. F. Thorpe, Junior Assistant to Mr. Isaac Carr at the Widnes Gas and Water Works, has been appointed to the post of Assistant-Manager, rendered vacant by the removal of Mr. Tim Duxbury to Middleton, as announced in the JOURNAL a fortnight ago.

Increase in the Salary of the Darwen Gas Manager.—At the meeting of the Darwen Town Council last Thursday, the recommendation of the Gas Committee to increase the salary of the Gas Manager (Mr. Thos. Duxbury) by £50 per annum, to which reference was made last week, was brought up, and gave rise to a long discussion. It was, however, eventually agreed to by 19 votes to 4. In future, Mr. Duxbury's attention will be given exclusively to the gas-works; the management of the water-works having been placed in other hands.

The Use of Explosives in Well-Boring Operations.—In the JOURNAL for June 3 last, we gave an account of a successful experiment, carried out by Messrs. J. Taylor and Sons, of Great George Street, Westminster, in the use of the explosive "Roburite," in connection with a boring for water near Herne Bay. Bearing on this subject, Mr. G. F. Chace recently remarked before the New England Water-Works Association that the effect of the explosion, about one time in three, is to increase the water, though sometimes the supply is diminished. The *Engineering and Building Record* quotes Mr. H. G. Holden on the matter. He said: "I have blasted several wells, and all of them but one resulted in giving more water. I never knew of a case of its being less. I blasted one on the Hudson River—a well of about 1000 feet deep—for a paper-mill. The supply was very small indeed. I put in three charges of nitro-glycerine, 25 lbs. to a charge, and it was successful. This depends a good deal, however, upon whether there are any water-bearing veins anywhere in the vicinity. If there are, a heavy explosive will sometimes open the veins so as to get a great deal more water. But I do not understand how the effect would be to close anything up so as not to get so much, unless the well caved in. It might do this if it was in very soft material; but ordinarily it makes a large chamber wherever the explosive lies."

A Reminder of an Old Invention in Gasholders.—A correspondent forwards a cutting from an old number of the *Builder* (about 1864); thinking that the present revival of discussion about gasholder construction will justify it being recalled to mind. It is as follows; and our readers will see that the proposal is something almost identical with Intze's patent tank and holder described in a paper read before The Gas Institute in 1885: "Mr. Frederick Gye, of the Royal Italian Opera, Covent Garden, has invented certain improvements in constructing gasometers and gasometer tanks. He constructs a gasometer tank in such a manner as to render available much of the central space of land now covered or occupied by the tank of a gasometer. The tank is made double at the outer circumference, to receive the water or fluid employed; the interior space being left free for use when roofed or closed in air and gas tight. Instead of placing a gasholder-tank on the surface (or below the surface) of the ground, Mr. Gye erects a circular wall of brickwork or a circular framework of iron or other suitable material. This circular erection may be perforated with arched or other openings of a height convenient to admit men or materials being carried through them. The breadth of this wall or erection is to be sufficient to admit of a double or ring gasholder-tank being placed on its upper surface; the tank being of sufficient width to admit of the working therein of a single or double—that is, a telescope—gasholder. The space extending from one side of the interior tank to the other is to be roofed over. There is then a covered circular apartment approached by the openings through the circular wall or structure below. The roof of this apartment may, if necessary, be conveniently supported by a central column with radiating struts (umbrella-like) or by a series of columns or otherwise. This invention is also applicable when constructing gasometers the tanks of which are built below the level of the surrounding ground, and for which an excavation has been made; only, in that case, it would be necessary to descend by an inclined plane, or other means, in order to enter the enclosed covered space under the gasometers. As the action of the wind might be found inconvenient, the outer ring of the tank may be made of a height equal, or nearly so, to the greatest height to which the outer gasholder will rise when completely filled with gas; and on the inside surface of this outer ring are placed either the wheels or the guide-rods necessary to the steady working of the holder."

TECHNICAL RECORD.

OUR GUIDE TO THE PURCHASE OF COAL.

A Paper read by Mr. Lawrence Hislop, of Uddingston, at the Annual Meeting of the North British Association of Gas Managers.

I have the opinion that, whatever importance may be attached to the engineering and other details connected with our business, the subject which I bring before you is one at the present and at all times of high importance; coal forming, as it does, the principal factor in our whole operations. It is rarely that coal, or any other item, affects our industry as it is doing at the present time. I therefore bring before you the following method by which I have conducted the purchase of coal during the past sixteen years—only varying in some years by advertising for offers instead of issuing a printed circular.

On the day following the date on which the tenders are to be in, they are handed to me as received. I open them and back them up; writing the name of the coal, and the price at which it is offered, on a scroll sheet. I then write them up in their order of price, with the cost per 1000 cubic feet, and that portion of the analyses shown in Table I., which is a copy (omitting the columns for the name of the coal, the tenderers, and the remarks on the coal) of the tenders for the supply of coal to us at March 31, 1889. From this table, and other knowledge which I possess of the coals, I select those best suited for our purpose, and make up a few mixtures to the extent we intend to purchase; tabulating them as shown on Table II. (with the addition of a column for the name of the coal). In these tables my Directors can at once comprehend the whole of the offers, and in a very brief space of time select the best value, and fix their contracts accordingly.

I think it is conceded by all experienced in the use of Scotch cannel that it is both essential and profitable to use a mixture; and as our works and requirements vary according to our different localities, we should each one of us be the best judge of our requirements, and, from the manner in which these tables are put, be able to select the coal most suitable for our purpose, were these analyses a true guide. But they are not. Therefore it is necessary that, before we make our purchases, we should be possessed of more knowledge of the coal than is conveyed in these laboratory analyses, even in their utmost detail. Within the past few months, I have had strong proof of this; having had occasion to make several trials of coal, some of which were being offered in the market this season for the first time. Here I give one instance of how analyses may lead us astray by taking them direct from the laboratory. A gentleman, whom many of you know and respect, was offered this coal at what appeared to him good value, as compared with most others being offered in the market. He thought proper to have a practical analysis and report made on a truckload of about 5 tons of the coal. On the receipt of that report, he was much astonished at the difference he found between it and the laboratory analysis, and consequently he did not buy the coal. A sample of the coal is here for inspection by the members. Here are extracts from the reports:

Laboratory Analysis.		*Practical Analysis.*	
Volatile matter . .	39·99 p. ct.	Volatile matter . .	40·36 p. ct.
Gas per ton	10,840 c. ft.	Gas per ton	8860 c. ft.
Illuminating power .	27·35 cndls.	Illuminating power .	20 cndls.
Ash in coke	9·20 p. ct.	Ash in coke. . . .	21·25 p. ct.
Tar per ton of coal .	19·5 gals.	Tar per ton of coal .	18 gals.
Ammoniacal liquor .	17·5 gals.	Ammoniacal liquor .	24 gals.
Remarks.—In both gaseous and coke products, the foregoing results prove this to be an excellent second-class cannel coal. It contains at same time a very moderate amount of both sulphur and water.		*Remarks.*—This is a gas coal of very low quality, requiring an excessive amount of retort space and fuel to carbonize it. The coke for use in ordinary gas-works furnaces is almost worthless, and would be found very unsuitable for small or medium sized gas-works.	

This is no doubt an exceptional case, owing to the mixed and irregular nature of the coal; forming as it does a rare mixture of coal, stone, calcium carbonate, pyrites, &c. From that truckload of 5 tons there could have been no difficulty in selecting a piece sufficient for the laboratory analysis entirely free from stone and many of the other impurities contained in the bulk of the coal. Such a piece, I believe, would be sent to the analyst. Therefore, do not blame the analyst, as he no doubt does his best with his apparatus, and gives the results of what he has obtained from the small quantity of the coal sent to him. He receives a selected piece of coal, probably of very irregular shape, no doubt showing the section of the seam, but thoroughly cleaned, and free from common coal or stone. Therefore it cannot be accepted as being a true indication of what may be sent from the pits in truckloads, or as we receive the coal in the works. Hence there is often very great difference in the practical results obtained in working from those presented to us in laboratory analyses; and this even with the most improved methods of distillation and other treatment of the products of the coal.

Another proof of this I have found in my past year's working (the results of which I give), as the bulk of the coal used was from pits from which we have had supplies many times before during the last twenty years, although they are now wrought under different lessees, in whose hands the coal has not improved, but rather deteriorated—it being mixed with a greater

amount of common coal, dross, dirt, stones, and other pit rubbish. Notwithstanding all this, the coals are now offered with a new analysis showing an average increase in the quantity of gas per ton of 7·8 per cent., and an increase in illuminating power of 6·3 per cent. Where exhausters are in use, the largest quantity obtainable should be produced from the coal. I have not an exhauster, although we now make about 21 million cubic feet of gas per annum. The gas registered at the station meter from our working last year was 10·2 per cent. less than what was given in the laboratory analysis—the gas accounted for, including that used on the works and sold, being 16·9 per cent. less than in the analysis; and this with good retorts, and a regular, good heat, with an average of about 5 inches of pressure on the hydraulic main and a ¾-inch dip. Under the same conditions of working during the course of the last ten years, the quantity of gas produced per ton of coal carbonized, as registered at the station meter, has averaged 6·2 per cent. less than in the analysis; and the gas accounted for has been 13·5 per cent.

From the very high and extraordinary analyses now being obtained of many of the coals offered in the market, I am of opinion that the difference between them and practical working will continue, and even become greater. Many of these coals we have been long familiar with, and whatever analyses of them may now be obtained, we should not allow ourselves to be deceived.

TABLE I.

Cost per Ton.	Quantity of Gas per Ton.	Illum. Power.	Ash in Coke.	Sperm per Ton.	Volatile Matter.	Cost per 1000 Feet.
s. d.	Cubic Feet.	Candles.	Per Cent.	lbs.	Per Cent.	d.
20 6	11,490	31·48	4·42	1239	47·56	21·40
20 3	12,461	35·34	7·00	1509	52·44	19·50
20 3	11,294	35·75	5·33	1384	50·26	21·51
19 10	12,940	32·81	5·60	1455	47·82	18·39
19 0	12,330	32·45	4·80	1371	48·02	18·49
18 9	12,229	31·60	6·20	1324	46·18	18·39
18 2	12,070	30·89	8·02	1277	45·10	18·00
15 6	11,753	33·16	18·33	1336	44·42	15·82
13 7	10,811	31·62	12·36	1172	48·72	15·00
12 0	10,428	27·54	4·97	984	44·10	13·80
11 1	10,724	28·37	13·60	1043	38·94	12·40
11 0	11,462	29·22	9·64	1148	41·20	11·51
10 0	10,301	22·30	9·20	787	38·63	11·64
10 0	10,769	28·76	8·40	1061	40·47	11·14
9 9	10,439	26·34	15·21	945	36·30	11·20
9 6	10,913	28·32	17·20	1059	39·70	10·44
9 0	10,859	27·86	20·20	1037	39·90	9·94
8 9	10,652	26·64	7·11	817	38·42	9·85
8 6	10,540	24·15	7·60	872	33·92	9·57
8 4	10,640	23·21	7·20	846	33·73	9·40
7 10	10,780	24·54	6·80	906	35·62	8·71
7 9	10,818	23·33	6·80	861	36·72	8·59
7 8	9,110	26·05	10·47	813	41·08	10·00
7 8	10,513	25·33	5·60	913	35·05	8·75
7 6	10,561	22·32	7·55	808	37·42	8·52
7 6	9,842	22·42	7·20	756	33·49	9·14
7 6	10,521	24·36	10·64	878	35·93	8·55
7 4	10,647	27·20	16·80	992	38·92	8·26
9 1	10,356	39·75	48·26	1411	41·42	10·50
8 5	10,140	36·13	69·55	1256	39·88	9·96
8 4	9.533	33·66	52·81	1099	39·29	10·48
7 8	10,517	35·26	43·20	1271	40·44	8·65

TABLE II.

Number of Tons of each kind of Coal.	Amount of Money.	Quantity of Gas per Ton.	Illum. Power.	Cost per 1000 Feet.	Ash in Coke.	Volatile Matter.	Cost per Ton.
	£ s. d.	Cub. Ft.	Candles.	d.	p. ct.	p. ct.	s. d.
400	396 13 4						
600	570 0 0						
800	300 0 0	11,618	28·40	14·11	6·20	43·11	13 8·80
100	37 18 4						
1900	1304 11 8						
500	495 16 8						
500	475 0 0						
800	300 0 0	11,650	28·42	14·02	6·24	43·10	13 8
100	37 18 4						
1900	1308 15 0						
500	495 16 8						
500	475 0 0						
800	310 0 0	11,758	28·85	14·11	5·91	42·80	13 10
100	37 18 4						
1900	1318 15 0						
400	396 13 4						
600	570 0 0						
600	225 0 0	11,713	29·10	14·42	6·43	43·51	14 1
200	110 0 0						
100	37 18 4						
1900	1339 11 8						

TABLE II.—*continued.*

Number of Tons of each kind of Coal.	Amount of Money.	Quantity of Gas per Ton.	Illum. Power.	Cost per 1000 Feet.	Ash in Coke.	Volatile Matter.	Cost per Ton.
	£ s. d.	Cub. Ft.	Candles.	d.	p. ct.	p. ct.	s. d.
500	495 16 8						
500	475 0 0						
500	193 15 0	11,711	29·00	14·17	6·55	42·60	13 10
300	112 10 0						
100	37 18 4						
1900	1315 0 0						
500	495 16 8						
600	570 0 0						
700	212 10 0	11,743	29·00	14·64	6·09	43·66	14 4·57
100	37 18 4						
1900	1366 5 0						
600	595 0 0						
400	380 0 0						
800	310 0 0	11,790	28·87	14·10	5·95	42·80	13 11
100	37 18 4						
1900	1322 18 4						
500	495 16 8						
500	475 0 0						
800	333 6 8	11,650	28·80	14·50	6·09	41·55	14 1·50
100	37 18 4						
1900	1342 1 8						
500	495 16 8						
500	475 0 0						
600	225 0 0	11,640	29·15	14·51	6·47	43·50	14 1·73
200	110 0 0						
100	37 18 4						
1900	1343 15 0						
500	495 16 8						
500	475 0 0						
600	232 10 0	11,740	29·26	14·14	7·00	43·00	13 10
200	73 6 8						
100	37 18 4						
1900	1314 11 8						

THE CONNECTION OF LIGHTNING CONDUCTORS TO GAS AND WATER PIPES.

In the JOURNAL for the 1st ult., we noticed a communication on the above subject addressed by Professor Oliver Lodge to *Industries*. In relation to this matter, an article by Professor L. Weber appeared in the *Elektrotechnische Zeitschrift* on the 4th ult., some points in which we reproduce from an abstract in a recent issue of the *Electrical Review*.

Professor Weber says Professor Lodge's investigations were restricted by two presuppositions—viz., that the duration of a flash is very brief, occupying something like a millionth part of a second ordinarily, and that the discharge is oscillatory. Consequently the only inference that could be drawn is that self-induction may be best avoided by exchanging the solid conductor for a flat or hollow one, and by making the conductors branch as much as possible; further, that the best means of diminishing the dangerous spreading of the fluid, which is due to self-induction, is to augment the conductor's capacity, the most practicable method of doing which is to connect the conductors to the gas and water system. Professor Weber says there is indubitable evidence that the duration of a flash may vary within very wide limits. There are flashes which do, indeed, last only for the millionth part of a second; but there are, besides, flashes whose duration is from half to one second. These are called long-duration flashes, and are further distinguishable from the others by their ruddy tint. It is extremely probable that it is only long-duration flashes which have the power to communicate fire, although violent mechanical and physiological disturbances may be occasioned by those of brief duration. That the latter may possess oscillatory characteristics can, by analogy with artificial sparks produced by a battery, and on the authority of Professor Lodge's observations, be accepted; but that they possess them normally has yet to be proved.

It will now be seen, says Professor Weber, that Professor Lodge leaves untouched a class of flashes which is of long duration and not oscillatory, as well as another class whose characteristics are perfectly established. His investigations only take account of flashes whose characteristics are hypothetical; and their only practical value, therefore, is to confer fresh importance upon one of the oldest established types of conductor construction—viz., that in which the conductors are attached to the gas and water systems—and, possibly, to bring out the superiority of Melssen's over Gay-Lussac's system.

REGISTER OF PATENTS.

Refractory Lumps for Gas-Fires.—Turner, H. C., of Camberwell, S.E. No. 6868; May 3, 1890. [6d.]

The object of this invention is to construct a fuel, which will become quickly incandescent, and "no matter how carelessly placed in position in the grate, will allow the gas-flames to ascend freely through the mass of fuel, and quickly bring same to a red glow." The improvements consist in a special shape (illustrated) of asbestos-fuel lump, with perforated or plain wings—three preferably with one perforation in each—converging to a centre.

Gas Cooking-Stoves.—Turner, H. C., of Camberwell, S.E. No. 6869; May 3, 1890. [6d.]

This invention has for its object the construction of protection plates in the interior of gas-ovens made of enamelled iron, to prevent the pulverizing of the enamel which occurs when enamelled iron plates are brought in too close contract with the heat, as in ordinary gas-stoves. The improvements consist in so fixing cast-iron protection plates as to prevent the heat acting upon the enamelled plates; the top of the protection plates being made to carry the enamelled plates, being formed in such a way as to allow of easy expansion and contraction, and prevent any melted fat running down the side of the oven going through the joint into the packing of the stove.

Gas-Ovens.—Fletcher, T., and Clare, A., of Warrington. No. 7620; May 16, 1890. [6d.]

This invention, relating to gas-ovens, has for its object to enable such ovens to be used for grilling and toasting, in addition to their ordinary employment for roasting and baking. The addition to the ordinary details of construction consists in inserting within the upper part of the oven an inverted radiating surface of fire-brick, iron, or other suitable material, over which the flame from a grilling burner is caused to pass. The taps to control the supply of gas to the upper or grilling burner and to the lower or roasting burner respectively, are arranged in such a manner that the upper and the lower burners cannot both be turned on at the same time; and so the fumes from the lower burner can never suffocate the flame from the upper one.

Ascertaining the Hourly Consumption of Gas by Burners.—Fletcher, W. F., of Birmingham. No. 8377; May 30, 1890. [6d.]

Apparatus constructed according to this invention consists of an outer case of metal or other material, having a portion cut away so as to show an enclosed parallel tube of glass, at the top and bottom of which are placed caps of metal, in which are pierced holes for the passage of the gas through the interior of the glass tube. In this is fitted a solid cone or pyramid; or a hollow tube of any shape, with holes or slot for the passage of the gas, may be used. The cone or pyramid is made of metal or other suitable material; the base being fitted into the cap either at the top or lower portion of the tube. Around the pyramid is fitted a float disc of metal, with guides to keep it in a horizontal position. This indicating disc is made to act in the following way: The gas being admitted at the bottom of the glass tube, causes the disc to rise until a sufficient quantity of gas passes through the hole in the centre of the disc or float to supply the burner required to be tested. The quantity may be ascertained by reading off the figures on the index opposite to the float or disc; the index being marked to show the hourly rate of consumption of gas in cubic feet.

Fig. 1.

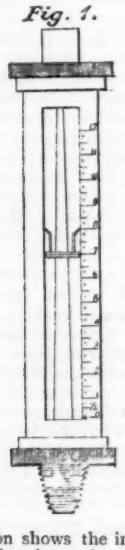
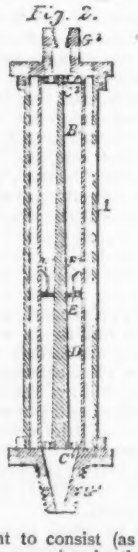


Fig. 2.



The illustration shows the instrument to consist (as stated) of an outer case or tube of metal A, having an opening in the front of the case to admit of viewing the action of the indicating float or disc; such indications being read off on the index on the outside case, as shown in fig. 1. Inside the case is placed a glass tube B, to the top and bottom of which are fitted caps C^1 C^2, which are perforated so as to allow a free passage of gas through the tube. To these caps are fitted a cone D, around which works the float or disc E, to which are attached guides F^1 F^2. For the purpose of fitting together and attaching, caps G^1 G^2 are screwed to the outer tube or case

Gas-Cooking Stoves.—Micklethwait, W. H., of Rotherham, Yorks. No. 11,498; July 18, 1889. [8d.]

This invention mainly relates to the construction and arrangement of gas cooking appliances, whereby they may be easily fitted together, or taken apart as desired.

The sectional parts are fitted with flanges, sockets, bolts, and latches in such a way that they firmly interlock; and the use of screws, tie-bars, or rivets for fixing the sections together is dispensed with. The invention also consists of an arrangement for securing the slides which support the oven shelves, by means of projecting hooks fixed on the inner sides of the oven, so that they can be easily removed, and as well as the oven be thoroughly cleaned. It also consists of a method of holding in position the drip pan or grid in connection with the grilling apparatus at any required distance from the burners, by means of a strip (or plate or pillar) having holes or notches of any required shape for holding the pan or grid. And lastly, it consists of a removeable plate or tray placed under the grilling apparatus, and on the top of the oven, so as to prevent grease or other deposit lodging on the top of the oven. This tray is raised clear of the top of the oven by means of rails or slides, in order to provide for its being readily removed.

Manufacture of Air Gas.—Monier, J. F. L., of Paris. No. 12,043; July 29, 1889. [8d.]

The object of this invention is to provide apparatus for making gas by carburetting atmospheric air; the inventor claiming for it the following advantages over the various patterns of the same style of apparatus at present in use: (1) The apparatus, being entirely metallic, and without special mechanism, is not liable to get out of order, and it works with perfect regularity. (2) The use of an automatic feed reservoir for the carburetter admits of replenishment at distant intervals; inasmuch as the capacity of the reservoir is proportionate to the number of burners the apparatus is meant to supply. (3) The atmospheric air reaches the carburetter at such a pressure as permits of passing it through a layer of gazoline, or any other equivalent liquid, in a state of ebullition, which promotes evaporation; and this arrangement ensures a continuously equal process of carburation and the complete consumption of the liquid contents of the apparatus, while dispensing with the necessity for storing up a supply of gas.

The invention consists in the application of an ejector, based on the Giffard system, with a draught of air by means of a jet of steam; and it is planned in suchwise that, given an effective minimum pressure, while the volume of air drawn along corresponds to the required supply, the carburetted air thus transformed into illuminant gas will issue from the outlet under a pressure that will carry it to great distances and up to any desired altitude.

Fig. 1.

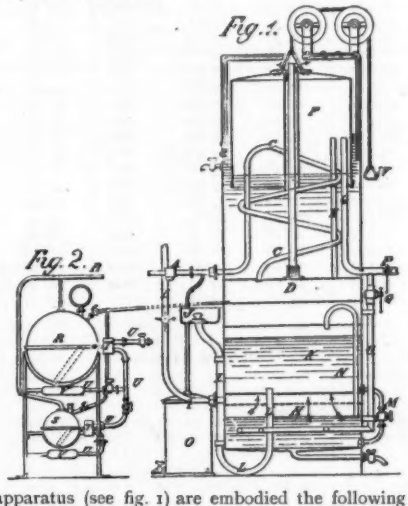


Fig. 2.

In the apparatus (see fig. 1) are embodied the following parts: An injector A, drawing the air by a steam-jet coming along a pipe B fitted to it. A coiled pipe C, conducting air and steam mixed together and crossing a vessel filled with water for the purpose of condensing the steam. A condensation reservoir D, the capacity whereof must exceed the quantity of condensed water receivable, so as to allow for the circulation of air. A pipe E, conducting the air freed from steam into a dome or bell F fitted at the upper part of the apparatus, and the weight of which dome must be proportionate to the pressure of steam forcing air into the carburetter. [The vertical guidance of this dome or bell is effected by means of an iron rod fitted to the bottom of the reservoir and extending into a pipe fixed to the upper part of the bell; the lower extremity of the pipe being perforated, or provided with several wide slits to allow the surplus air not utilized to escape at a time when, owing to pressure, the bell might be caused to ascend higher than the pre-determined level.] A pipe G for conducting air into the carburetter fitted at the lower part of the apparatus; the pipe being in the shape of a double coil or two rings, and pierced along its entire length with a number of perforations through which the air escapes across the liquid. A tray or shelf H with a large number of perforations. An outlet-pipe I conducting the gas to the supply pipe. A filling basin J. A reservoir K and a syphon pipe L, for conducting the liquid into the reservoir and ensuring a perfectly hermetic seal. A feed-pipe M to the carburetter. A tube N for determining the level of the liquid in the carburetter, when, as a consequence of evaporation, this tube becoming uncovered at its lower extremity the air will penetrate into the reservoir, and by exerting pressure upon the liquid therein contained impels it to run out through the pipe M until the re-establishment of the level determined by the tube N, whereby an automatic feed for the carburetter is insured. A vessel

O for receiving the condensation liquid produced in the ascent of the pipe C in the water.

It will thus be seen that it will suffice to connect a steam-pipe to the injector—provided such steam be at the needful pressure—to draw the air, which is borne along in a state of admixture with the steam, into a pipe running through a basin of water so as to condense the steam with which it is mixed, carry the air into the bell placed at the upper part of the apparatus, in order to force it into the carburetter and obtain at the exit a supply of carburetted air transformed into illuminating gas. It will not be necessary to have any gas stored up unless desired; for it will suffice to turn the tap P, after first closing the tap Q, to completely exhaust the air from the bell.

The apparatus is easy of application in establishments where a steam-engine is fitted; and it is similarly applicable in private houses if a small steam generator, a boiler, or analogous steam apparatus, be provided. For the various applications where no steam-engine is available, the patentee has designed a small steam generator (illustrated in fig. 2), constructed as follows: An iron frame is made, in which are two superposed spherical copper vessels R S, containing the water to be converted into steam; and under each of these vessels is placed a gas stove or burner. The vessel R exceeds in capacity to the extent of one-third part the volume of steam required to be generated (so as not to run short of water), and in accordance with the needful quantity of air to feed the apparatus, in view of the number of burners it is wanted to supply, on the basis that 1 kilo. of steam will draw 1 cubic metre of atmospheric air. The second vessel S is smaller in dimensions, as it is employed merely to produce the necessary amount of steam wherewith to draw the air to be transformed into gas, and heat the upper vessel destined to feed the ejector in quantities sufficient for the supply of air, according to the duration of the period of illumination and to the number of burners in use. Thermostats T close to a considerable extent (so as to allow only a very small passage for the gas) the passage to the gas-stoves, in such wise as to secure automatic regulation the moment the temperature inside the recipient attains to a degree answering to the pressure required to work the whole system. The pipe U feeding the gas-stoves V is connected to the outlet-pipe of the carburetter. A cord and handle W are employed to raise the bell F, with a view of getting a sufficient quantity of air for heating the smaller spherical vessel S.

The working of the steam generator will be readily understood. It will suffice to raise the bell F, by pulling down the handle W, after first shutting and opening the respective stopcocks—that for admitting atmospheric air to the bell must be shut as soon as the bell shall have reached the end of its ascending course, while the other cock must be opened to procure without delay an adequate supply of gas to heat the smaller spherical vessel S. The moment the temperature inside this vessel has risen to the degree necessary to obtain the requisite amount of steam and pressure, the bell (which will have come sensibly down) will at once again ascend. At this moment the tap of the stove of the larger spherical vessel R must be opened; and when the gauge indicates 1·5 kilos, the tap of the stove of the smaller spherical vessel may be shut, and a normal degree of pressure will be maintained by means of the thermostats.

APPLICATIONS FOR LETTERS PATENT.

11,740.—SMITH, S. H., "Improvements in gas-producer furnaces." July 26.

11,755.—RICHARDSON, J., and NORRIS, W., "Improvements in gas or vapour engines." July 28.

11,762.—GREENWOOD, E. P., "Improvements for heating and cooking by gas or coal." July 28.

11,784.—SCHIRM, J. W. C. C., "Improvements in the method for producing intense light by magnesium or by other glowing materials." July 28.

11,786.—HABEN, J., "Clearing away spring or other water accumulations, to be called a 'Self-acting reservoir.'" July 28.

11,798.—PARKINSON, W. C., "Improvements in low-pressure water-meters." July 28.

11,834.—SCHIERSAND, P. M., "An improved spring governor or regulator for gas and other engines and motors." July 29.

11,918.—HUELSER, C., "A device for lighting and extinguishing gas-lamps." A communication from A. Silbermann. July 30.

11,943.—PURCELL, M. F., and PRESCOTT, G., "An improved method of, and means for, the application of carbonic anhydride, alone or in combination with other gas or vapour, as a motive fluid for engines or other power motors." July 30.

12,008.—BALLARD, T. W., "Improvements in gas-fires." July 31.

12,016.—FOULIS, W., "Improvements in the stirring and drawing of the charge in gas-retorts, and in the apparatus employed therefor." July 31.

12,110.—BRIDDICK, J. T., "Improvements in or relating to pipe joints or couplings." Aug. 2.

Water in Queensland.—Water has been struck at an artesian boring at the Corindah Station, near Aramac, Queensland, at a depth of 500 feet. The supply yielded is about 150,000 gallons per day.

Dorchester Gas and Coke Company, Limited.—In the report to be presented by the Directors of this Company at their half-yearly meeting to-day, they state that the gas sold in the six months ending June 30 last exceeded, although very slightly, the quantity sold in the corresponding period of 1889. The price of coal averaged 17s. 5¼d. per ton, as against 15s. 9¾d. in the first half of last year; and the Directors state that if the present high rate is maintained for another six months, they will have to consider the expediency of raising the price of gas or reducing the dividend. The rise in the cost of coal is equal to an increase of about 3d. per 1000 cubic feet in the cost of gas manufacture. To meet the present difficulty, the Directors have transferred £243 19s. 1d. from the reserve fund to the net revenue account; and they will recommend dividends at the same rates as before—viz., 11 per cent. on the ordinary shares, and 6 per cent. (less income-tax) on the preference shares.

CORRESPONDENCE.

[We are not responsible for the opinions expressed by correspondents.]

The Wire-Rope System of Gasholder Guiding.

SIR,—We are afraid that serious misapprehension may arise as to the position of affairs between Messrs. Gadd and Mason and ourselves from the paragraph in the JOURNAL for July 22, page 193.

The statement that Mr. Gadd "remains the legally acknowledged original inventor in this country and others of any form of guiding a gasholder without upper framing" is stating the case too strongly. The enclosed tracing of a form of gasholder, very common some years ago, is quite sufficient to show that there were holders without columns working many years before ever they took the matter up. You will notice that there are no carriages on the holder; and that the holder is kept level by the three chains united in one weight.

The appeal, the subject of the paragraph, in no way impeached the validity of our Mr. Pease's patent, which was issued some months ago.

ASHMORE, BENSON, PEASE, AND CO., LIMITED.

Stockton-on-Tees, Aug. 4, 1890.

Gasholder Construction.

SIR,—If Mr. Cripps held a brief with instructions to prove the position he hastily took up, one could understand the peculiar arguments he adduces in support. As this, however, cannot be the case, it is very difficult to see the drift of the particular line of reasoning adopted.

He asks me, in your last, why I drew a certain conclusion, in my paper, as to the meaning of Mr. Webber's proposal. My answer is that I never did draw such a conclusion at all; neither did I dream of doing so. Mr. Cripps must find it difficult to unearth evidence for his "history," when he is led to suggest such an extraordinary misuse of my words. I thought I was putting the case in such a form as would effectually ensure its *repudiation* by Mr. Webber. As to the italicized words, "guiding from the base," they are clearly and fully explained in the sentence in which they occur. They were also quite natural for Mr. Webber to use in connection with a proposal to dwarf the guiding arrangement to within 6 feet of the base of his holder.

But I make now an important discovery. It appears that Mr. Cripps only desires his history to be read in a *technical* sense. Perhaps it may be pardoned if I have assumed towers or piers, having guide-rails on their faces, fixed all round a gasholder, and standing 6 feet above the tank water-level, to be, "to all intents and purposes," *guide-framing*. It seems Mr. Cripps does not think these constitute framing, and the "columns" were substituted—he says abolished (?)—by the piers aforesaid, and the girders and wind-ties were dispensed with, in Mr. Webber's proposal.

I will try and recognize Mr. Cripps's fine technical distinction, which appears to form satisfactory shelter for him in this matter; and will say that I think my meaning cannot well be misunderstood, and probably is not so misunderstood by any other candid reader. Anyway, I hope not. I deny, then, that any person prior to myself ever proposed *to abolish entirely all upper and external means for the guidance and support of gasholders*. Any structure or apparatus, erected around and external to, and raised above a gasholder tank—even if it were only half 6 feet—for the purpose of guiding and supporting the same, I have hitherto considered and understood as guide-framing. I fear that both myself and the general public will continue to so understand it, Mr. Cripps's technical hair-splitting notwithstanding.

I feel sure that Mr. Webber has not the slightest desire to claim credit for more than his due in this matter; and I am quite certain I shall never attempt to detract from the meritorious courage he displayed in starting the discussion he did. It is perfectly clear that Mr. Webber was impressed with an idea that the greater portion of the guide-framing of gasholders could be dispensed with; but he came to this conclusion, and therefore proposed a substitute, on grounds which were not sound. But, nevertheless, he did open the subject, and set others thinking thereon. All honour to him. Although I was constrained to entirely condemn his proposal, it set me (as I have many times said) upon the problem of gasholder construction; and, as a result, I not merely substituted one guide-framing, or means of guidance, for another of a different order, but entirely abolished all means of guidance and support external to, and above the tank. This I know to be the true history of the evolution of a naked gasholder, and what I believe everybody in the gas world well knew to be such. Why Mr. Cripps should desire to represent this differently, at this time of day, is a marvel to me.

W. GADD, C.E., F.R.M.S.

Manchester, Aug. 7, 1890.

Mr. Gadd's Gas Institute Paper.

SIR,—I have no desire to prolong Mr. Gadd's "agony," nor to try the patience of your readers; so I will conclude what I have to say on this subject by as briefly as possible reviewing the question up to the present.

The paper read by Mr. Gadd (see JOURNAL for July 8) he described as a "purely mathematical one;" and he emphasized this by stating, in his reply on the discussion, that "mathematics were mathematics, and no amount of personal consideration of any kind could dispense with them, or would ever make three angles of the triangle more than two right angles. As engineers they must act on true principles in construction." As Mr. Gadd proclaimed this about his paper, I think we have a right to expect that, as mathematics is an *exact* science, Mr. Gadd's paper should partake—in some degree, at any rate—of that quality. On reading it, however, I was astonished to find that it was not simply unreliable but teeming with errors; and not considering it desirable, or advantageous to the profession as a whole, that errors should be promulgated under a show of mathematics, or what some might be tempted to designate a superficial knowledge of mechanics, I ventured to expose them in my article contained in the JOURNAL for July 15. I am sorry my manner of doing it should have appeared offensive to Mr. Gadd. It was never intended to be so. The extent and

seriousness of the errors certainly demanded a somewhat severe method of treatment.

In my article, I took the obvious meaning of the words Mr. Gadd used in setting forth his views, and the meaning which I considered would be attached to them by most well-informed engineers, reading the passage from an impartial point of view. I still maintain the views of gasholder construction, and the principles involved therein, as expressed in my article; and although much discussion has followed, I fail to see that Mr. Gadd has established any other reading or interpretation than that which I put upon his words at the outset. Moreover, it should be borne in mind, as a proof that I had no desire to take the slightest advantage of Mr. Gadd in misquoting or misinterpreting his words or meaning, that I more than once appealed to your readers to accompany the reading of my article with Mr. Gadd's paper. At the outset I said: "I must ask anyone sufficiently interested in the subject to read this article side by side with Mr. Gadd's paper, as, naturally, I cannot quote word for word whole paragraphs from his paper, which otherwise would be necessary to make my meaning clear." And again, immediately preceding the much-debated portion: "I must again ask your readers to follow Mr. Gadd's paper side by side with my remarks thereon." What could be fairer than this? I reproduce these passages here, because Mr. Gadd, throughout all this correspondence, has endeavoured to impress your readers that I do not treat him fairly; that I "do not bestow that careful impartiality one has a right to expect from an otherwise able man"; that I "unfortunately seem to prefer to misrepresent him"; that I "profess to accept his explanation of an admitted error, and then seek to discredit it"; that I "am more anxious to score or to prove him tripping than to arrive at the truth"; that "much of what I have written is entirely foreign to his paper, and is couched in a lofty, patronizing vein that betrays an appearance of something he was sorry to observe"; and much more of the same sort of thing. All this is, of course, very amusing, and perhaps interesting to those who do not understand the scientific aspect of the case; but is such a style of argument at all to the purpose? I might, of course, very well return the compliments Mr. Gadd has thus so generously showered upon me; but I have hitherto preferred to try and convince him of his errors. As, however, I find that he shifts his ground on every point, and does not attempt, in a mathematical or scientific manner, to justify either the method or the figures he gave in his paper, I must, after this, leave the matter in your readers' hands, for them to judge for themselves between us.

It is impossible for me to recapitulate the whole of the errors contained in Mr. Gadd's paper without exhausting your patience; so I will content myself with alluding to those points he touches upon in his last letter to the JOURNAL (*ante*, p. 300), and which alone relate to the "mathematical" part of his paper.

As regards the first paragraph in his letter, I would only remark that it is not a question of the precise value of wind pressure that I am discussing, nor any other mere *data*; but it is the *method* he adopts of determining the strains, which I contend is absolutely wrong in every respect—not only as regards the vertical pressure on the tank guides, but also as regards the diagonal strain on the top curb to which he afterwards refers.

In the second paragraph of his letter, Mr. Gadd flies for refuge to the little word "if," to rescue him from the conclusion he has at last been forced to come to—viz., that it was not mathematically correct to distribute the vertical force on one side of the holder equally over the eight points. Mark well what he says. He does not say he did not commit this error, but that when he did it he used these words: "= 10,000 lbs. of total vertical force which, if distributed equally through the points represented by the eight rails = 10,000 ÷ 8 = 1250 lbs. = the simple vertical force on each rail acting in contrary directions on opposite sides." Now, I ask Mr. Gadd: (1) On what grounds he distributed this force over *eight* rails, when it should only have been distributed over *four* at the most? (2) Why he distributed it *equally*, without qualification, when it was incorrect to do so, knowing all the while that he was misleading his listeners? [This has nothing whatever to do with his assumed wind pressure, whether West Indian or English. It is not his *data*, but his *method* that I am dealing with; so he cannot explain it away by a reference to his admission that he made *one* error in his paper, on the score of wind pressure.] As I have said, he takes refuge in the word "*if*;" pleading that he used it "*designedly*, to avoid the necessity of working out complex details." Is this fair to his hearers? He presents his paper to them as a mathematical one, and therefore it does not warrant him knowingly and *designedly*, and without cautioning them, *understating the strain on his holder to a fivefold extent*, especially when his hearers are given to understand that he had put them into a position to work the strains on his holder in detail. Then the excuse is a lame one altogether. There is no more "complex detail" involved in the distribution of the pressure over *four*, than over *eight* rails; and approximation to the truth could be obtained without any "complex details," as I have shown clearly in my article.

Now for Mr. Gadd's assertion, in the third paragraph of his letter, that I "assume that the point of view he took would throw all the weight on *one* rail." Is this quite candid? All along I have argued that Mr. Gadd was wrong in throwing the vertical pressure on one side on to *eight* rails instead of on three or four (according as you take the neutral axis as in fig. 3 or fig. 4 in my article). I have never suggested that Mr. Gadd in his paper threw all the force on to *one* rail. He made the suggestion himself quite recently, in these words: "Now, if one side of such a holder be lifted, the *fulcrum* or *turning-point* is the opposite side." What did he mean by this statement? A sentence which follows may perhaps enlighten us. Mr. Gadd says: "If a four-legged table be lifted at one end, half the weight of the table is supported by the floor; and the other half by the person lifting." I naturally replied that *if* (mind, I used Mr. Gadd's favourite "if") we were to take this view of the subject, it would not aid him in the slightest in proving his figures to be correct; because, in order to turn the gasholder on the opposite side as a fulcrum (like the table by which he illustrates it), it would necessarily bring 16 times more downward pressure on the fulcrum rail than he had said there was in the first instance. Mr. Gadd cannot do better than allow the neutral axis to remain where I put it in figs. 3 and 4 of my article. I can only assure him that if he attempts to alter it, he is only *in*creasing—not *de*creasing—the strain on the points of support; so that he must find some other method of proving my figures to be wrong.

Having now, I hope, cleared up the difficulties arising out of the discussion of the "mathematical" portion of Mr. Gadd's paper, it only remains for me to notice his references to the *plus* and *minus* signs. I quote the whole passage from his last letter, interspersed with my comments, so that Mr. Gadd cannot accuse me of misquotation: "My signs doubtless would be in the wrong places—or some of them—were my object to show whether the metal was in tension or compression. [Note this admission on Mr. Gadd's part.] I again repeat that Mr. Cripps *must* know that I was not using them for that purpose at all, or I should have used *double* signs, one on one side and one on the other." I am not aware that Mr. Gadd ever said that the signs were not to indicate the *character* of the *strains* in the parts to which they are adjacent; but, if they are not for that purpose, I fail to see what useful purpose they serve. Mr. Gadd continues: "They were merely used as single signs, to show the *forces at work*, so as to enable the reason of the fourfold strength to be demonstrated." But, I ask *how* does it enable the reason of the fourfold strength to be demonstrated? I repeat, and challenge Mr. Gadd to prove otherwise, that the signs as placed on his figs. 3 and 4, whether they represent *force* or whether they represent *strain*, are absolutely incorrect. The idea that they represent force is utterly absurd; and I challenge Mr. Gadd to prove otherwise. The only legitimate and acknowledged use you can make of the *plus* and *minus* signs in demonstrating graphically the effect of forces upon a mechanical structure, is to show the *compressive* and *tensile* strains set up in the structure. That was the use I made of them when explaining my views to him; and I know of no other. If, then, this be granted, Mr. Gadd's signs are, on his own admission, in their wrong places; and, therefore, as I said in my criticism, "as the character of the strains is incorrectly shown, I am at a loss to know how the results of his experiments can be *readily demonstrated from his figs. 3 and 4*." It may be an insignificant point; but Mr. Gadd did not treat it as such in his paper. I would not press Mr. Gadd so hard to admit his errors in these simple matters, if he had not betrayed a desire to impute unworthy motives to me in pointing them out. Moreover, have not the "considerable number of engineers," to whom he referred, a right to expect that he will himself keep somewhere within the bounds of accurate knowledge, when endeavouring to put them right?

In conclusion, I can only say that I am well content to remain among the "considerable number," if coming out from among them means embracing such erroneous views of mechanical principles as those set forth by Mr. Gadd in his paper read before The Gas Institute.

F. S. CRIPPS.

Sutton, Aug. 8, 1890.

The Warrington Corporation Gas Accounts.—The annual abstract of the accounts of the Borough Treasurer of Warrington for the past financial year contains the usual information as to the accounts of the Gas Department. It appears that the receipts from the sale of gas and meter-rents were £26,532; from fittings, £1162; coke, £2308; tar, £1668; and sulphate of ammonia, £1602. Amongst the payments were £2452 for wages, £855 for repairs to brickwork, £4329 for repairs to ironwork (including the renewal of the gasholder), £9338 for coke and cannel, £245 for purification, £163 for water, £810 for meter inspection and repairs, £187 for lamp repairs, and £466 for lamp-lighting.

The Blackburn Corporation Gas and Water Accounts.—The abstract of the accounts of the Borough Treasurer of Blackburn just issued contains particulars as to the gas and water funds. The gas-works are one of the best paying departments of the Corporation, though last year there was a deficit of £3172. The income was £76,176, while the expenditure was £56,935. Out of the balance of £23,241, all the capital charges had to be provided for, and a sum of £1000 was carried towards the water-works account. The deficit balance was met out of the reserve fund, which is thus reduced to £694. On the water-works account, the expenditure during the year was £34,716; while the income was £32,554.

Colonial Gas Undertakings.—The report presented by the Directors of the *Rockhampton Gas Company, Limited*, to the shareholders, at their last half-yearly meeting, showed profits to the extent of £1290, which, with £572 brought forward, made a total of £1862 to the credit of the profit and loss account. From this the Directors recommended the payment of a dividend at the rate of 10 per cent. per annum, amounting to £1483, writing off £200 for depreciation of plant, and carrying forward a balance of £179. The Company's London Agent (Mr. W. Coward) has been in Rockhampton conferring with the Directors respecting the development of electric lighting in other parts of the world; and he has been authorized to procure the best possible advice and information on the subject of an electric light installation of sufficient size for the town, with a view to its erection within the time prescribed by the Company's Act. In the meantime, it has been considered expedient to take steps for the erection of an additional gasholder, equal in size to the two now in use, which are found to be too small for present requirements.——The *Wanganui Gas Company, Limited*, realized less by the sale of gas in the year which ended in April last than in the previous twelve months; but this was compensated for by an increased sale of residuals. The results of the year's operations may be regarded as satisfactory, as there was a reduction in the price of gas. The Directors were enabled to recommend a dividend which with the interim dividend made 10 per cent. for the year, and add £500 to the reserve fund.——The *Perth Gas Company, Limited*, (a West Australian gas undertaking) had £1694 to dispose of at the close of the last financial year; and with it the Directors paid a dividend of 10 per cent., which took £1500, and added £194 to the reserve fund, making it £831. They are going to reduce the price of gas and allow discounts; and as the Engineer and Manager (Mr. E. Wigglesworth) states that the demand for gas has not equalled his expectations, this act of the Directors will probably stimulate consumption.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

During the past week the following progress was made:—

Bills read a second time and committed: Electric Lighting Provisional Orders Bill (No. 11).

Bills reported: Airdrie and Coatbridge Water Bill; Electric Lighting Provisional Orders Bill (No. 11); Tottenham Local Board Bill.

Bills read the third time and passed: Electric Lighting Provisional Orders Bills (Nos. 10 to 12, and No. 15); Warrington Extension, Water, &c., Bill.

Bills Royal Assented: Dewsbury and Heckmondwike Water Bill; Electric Lighting Provisional Orders Bills (Nos. 1 to 9, and No. 13); Gas and Water Orders Confirmation Bill; Glasgow Corporation Bill; Liverpool Corporation Bill; Morley Corporation Water Bill; Ystrad Gas and Water Bill.

HOUSE OF COMMONS.

Friday, Aug. 8.

THE ROYAL SOCIETY COMMITTEE ON LIGHTHOUSE ILLUMINANTS.

Mr. T. W. RUSSELL asked the President of the Board of Trade whether the Committee of the Royal Society appointed to inquire into the subject of lighthouse illuminants had sent in their report, and, if not, when it might be expected.

Sir M. HICKS-BEACH said he understood from the President of the Royal Society that the Committee did not propose to have any further interviews, and that their report was partly drawn up; but it seemed doubtful if it would be finished before the prorogation.

THE LIGHTING OF THE HOUSE.

Sir G. CAMPBELL asked the First Commissioner of Works if he would arrange before next session to put shaded electric lights in the roof of the House, so as to save members from the heat and glare of the gas in the long winter nights, and make the nearest possible approach to daylight.

Sir H. MAXWELL said the electric light was tried in the roof of the House some time ago; but the results were not satisfactory. The present gas-lights were connected with the ventilating arrangements; and it would be inconvenient to dispense with them.

During the past week the following progress was made:—

Bill read the first time: Electric Lighting Provisional Orders Bill (No. 15).

Bill read a second time and committed: Electric Lighting Provisional Orders Bill (No. 15).

Bill reported: Electric Lighting Provisional Orders Bill (No. 14).

Bills read the third time and passed: Bradford Corporation Water Bill; Electric Lighting Provisional Orders Bill (No. 14); South Lincolnshire Fen Water Bill.

LEGAL INTELLIGENCE.

HIGH COURT OF JUSTICE—Chancery Division.

Thursday, Aug. 7.

(*Before Mr. Justice* STIRLING.)

Benson v. Chandler and Others—The Late Mr. Hulett's Shares in Messrs. Kirkham, Hulett, and Chandler, Limited.

This was an application for an injunction to restrain the defendants (Samuel Chandler, Samuel Chandler, jun., and Josiah Chandler) from selling, transferring, or otherwise dealing with certain shares in Messrs. Kirkham, Hulett, and Chandler, Limited—a Company formed to work a patent for improvements in washing and scrubbing gas.

Mr. HASTINGS, Q.C., in support of the motion, explained that the plaintiff was the executor of the late David Hulett, of High Holborn; and his estate (which was a large one) consisted to a great extent of shares in companies. The testator, according to Mr. Benson's affidavit, held 954 fully-paid shares in the defendants' Company, the capital of which was £80,000, in £20 shares. After the testator's death, the defendant Samuel Chandler called upon the plaintiff and asked him to become a Director in place of Mr. Hulett. He told him that the Company was in a bad way, and that the testator's shares were quite unsaleable and utterly worthless; that the patent had nearly expired; and that another patent had been taken out which would quite supersede the Company's patent. Chandler afterwards offered to give 2s. 6d. a share for the testator's shares. Benson, believing the statements regarding the shares to be true, accepted the offer; and the shares were accordingly transferred to Chandler. Subsequently Benson found, it was said, that the representations were not true, and that the new patent really belonged to the Company, and was, in fact, being worked by them; also that, shortly after the sale of the shares, 3½ per cent. for the year was being paid upon them, which dividend on the testator's shares alone would amount to upwards of £700. The learned Counsel therefore submitted that Chandler had made certain misrepresentations which induced the plaintiff to part with the shares, and that consequently he was entitled to the injunction applied for.

Mr. PHIPSON BEALE, Q.C., who appeared for the defendants, denied that there had been any misrepresentation. He said that when Chandler agreed to purchase the shares the old patent had nearly expired, and there were great doubts whether the new one would work successfully. This being so, Chandler offered to give 2s. 6d. each for the shares; and remembering the great risk he was incurring in purchasing them, should the patent have turned out a failure, he (the learned Counsel) contended that Chandler was justified in paying that sum for them. He submitted, further, that the plaintiff was aware that a new patent had been obtained by the Company. He contended that the motion should be dismissed.

His LORDSHIP, in giving judgment, said that, looking to the entire omission by the defendants to say a word about the new patent being the Company's property, he thought the balance of evidence was in favour of the plaintiff. He should therefore grant the injunction restraining the defendants from dealing with the shares; but seeing that the payment of dividends was only a pecuniary matter, and did not affect the right of the plaintiff in the same way as the transfer of shares would do, the injunction would not extend to the dividends.

HIGH COURT OF JUSTICE—QUEEN'S BENCH DIVISION.

Wednesday, Aug. 6.

(*Before Lord Justice* LOPES.)

European Water Gas Company v. London and Colonial Finance Corporation

To-day his Lordship gave judgment in the above action, which had occupied him on the two previous days. It was brought by the plaintiffs to recover damages for breach of contract from the defendants, who, it was alleged, were assignees of a contract made by R. A. Panchaud to purchase the French and Belgian patents of the plaintiff Company, and certain other patents to be used in connection therewith, for £50,000 in cash and £10,000 in shares of a company to be formed for working the patents.

It appeared that on June 9, 1889, a Mr. Panchaud entered into an agreement with the plaintiffs, whereby, in consideration of the assistance to be rendered by him in the formation of a company for the purchase of certain patents, they agreed to sell the same to Panchaud or to his nominees for the sum of £50,000 in cash and £10,000 in fully-paid shares in the company. This offer, however, was conditional upon the acceptance thereof by Panchaud within a limited time. The plaintiffs subsequently agreed to extend the time for the exercise by Panchaud of the option given to him by such agreement, upon payment by him of the sum of £2000 as a deposit. Shortly before the time expired, Panchaud, being unable to find the sum required, applied to the defendants, who agreed to advance it upon the terms of an agreement dated July 1, 1889, whereby he undertook to assign to them the agreement of the 9th of June, 1889, with any subsequent modifications; it being provided that the defendants should, out of any profits which might arise, either from the starting of a company or otherwise, repay themselves any outlays or liabilities they might incur, including the £2000, and that the net profits, after such payments, should be divided as to five-eighths to the defendants, and as to three-eighths to Panchaud. The latter undertook, on demand, to execute a full assignment to the defendants of his contract with the plaintiffs. The £2000 having been duly handed over to the plaintiffs by the defendants, by a letter dated July 2, Panchaud informed the plaintiffs that the matter was then "definitely placed, and that the defendants were his nominees under the contract of June 9." A copy of this letter was forwarded on July 3 to the defendants by Panchaud in a communication which he addressed to them, stating that he had, at their request, accepted the plaintiffs' terms. The question, therefore, arose, whether under these circumstances, the defendants were liable to the plaintiffs as purchasers of the patents, and therefore bound to pay the balance of the £50,000 under the terms of Panchaud's contract, or whether the transmission was simply one of contract between him and the plaintiffs alone, with no privity between the plaintiffs and the defendants. The defendants contended that, in order to establish their liability, the plaintiffs were bound to show one of two things—either that Panchaud contracted with them as agent for the defendants, or that there was a new agreement whereby the plaintiffs agreed, with the consent of the defendants, to release Panchaud from his liability, and to accept that of the defendants in lieu thereof.

The ATTORNEY-GENERAL (Sir R. E. Webster, Q.C.), Mr. ASQUITH, Q.C., Mr. STUDD, and Mr. FLETCHER appeared for the plaintiffs; Mr. FINLAY, Q.C., Mr. R. O. B. LANE, and Mr. G. G. GREENWOOD for the defendants.

His LORDSHIP, in giving judgment, said the question was whether there was a binding contract between the plaintiffs and the defendants for the sale and purchase of the patents. It was not disputed that on June 9, 1889, there was a binding contract between the plaintiffs and Panchaud, which was clearly established by the correspondence. Under this agreement, Panchaud acquired a right to nominate himself or anybody else as a purchaser, and, provided the nominees assented to their position, and due communication was made to the plaintiffs, he thought privity would be established between the plaintiffs and the defendants. Panchaud, having obtained an extension of time in which to pay the £2000, applied to the defendants to advance to him this sum; and on June 30 the agreement was signed between him and the defendants. The question, therefore, arose to what extent this agreement was communicated to the plaintiffs, and whether the defendants assented to the terms of it. The letters of June 29, July 1, July 3, and July 6 were, in his opinion, a sufficient communication and acceptance of the agreement. Moreover, the minutes of the meeting of the defendant Company of July 4, 1889, strengthened this view. He was therefore of opinion that such privity was established between the plaintiffs and the defendants as entitled the plaintiffs to sue upon the contract; and therefore he should give judgment declaring that the plaintiffs were entitled to specific performance of the contract set out in the correspondence—the plaintiffs agreeing to waive such part of the contract as related to the payment in shares.

On the application of defendants' Counsel, stay of execution was granted if notice of appeal was given within a week.

SOUTHWARK COUNTY COURT.

(*Before Mr.* H. HOLROYD, *Judge.*)

The Liability of Agents and Owners of Property for Water-Rates.

A number of summonses taken out by the Southwark and Vauxhall Water Company against consumers for the non-payment of their rates recently came before his Honour. In most instances they were of the

ordinary character; but in the two reported below points of special interest were raised.

Mr. *F. Bisley*, an auctioneer and estate agent, of Chester House, Rotherhithe, and 53, Gracechurch Street, E.C. was sued for the recovery of £3 6s. in respect of six quarters' rate for the houses Nos. 17 to 20, Matilda Place, Rotherhithe, for which he was agent under an order of the Court of Chancery. He paid £1 13s. into Court, and disputed the remainder. He stated that he had only been appointed to superintend the property after three quarters of the rate had become due; and, therefore, he was not liable for the debt incurred previously, because the Company only had power to sue the agent for the time being.

His HONOUR observed that the power to enforce the present claim appeared to be given by the 58th section of the Company's Act.

Defendant said this section must be read in conjunction with the 4th. It was very hard that an agent who was receiving rents on property heavily encumbered should be called upon to pay water-rate for a time when he had nothing whatever to do with it. The houses in question had been the cause of much litigation; and, considering the outgoings, if he had to pay this amount, the probability was that it would come out of his own pocket.

His HONOUR said he feared that the Act made the person receiving the rents liable for the water-rates; otherwise, how would the Company get their money?

Defendant answered that the Company were in fault for allowing the accumulation of arrears. In the next place there was no necessity for them to sue him except for their own convenience, because they had power to make the amount due to them a charge on the property itself, and the Court of Chancery's receiver would then pay. If he had to do so, he could not make the claim on the property, and the proceeds of the rents were fully charged.

His HONOUR observed that Mr. Bisley had argued his case very ably. There was no doubt it was hard upon him to be saddled with the payment of a debt incurred before his connection with the property; but the Act gave the remedy to the Company, and all he had to do was to apply it. He must therefore decide in their favour.

Mr. TANNER (who appeared for the Company) said he would not ask for costs.

In the next case the Rev. *Isaac Doxsey*, of Camberwell, was sued in respect of a tenement, of which he was the owner, for 9s., being one quarter's water-rate.

Mr. TANNER said the defendant was the freeholder of a house at Camberwell rated at less than £20 for water purposes, and so he was liable, under the 58th section of the Company's Act, for arrears.

Defendant said in reality he contested the claim on principle, because, although the Act said the owner was liable, the Company had chosen, with regard to the house in question, to set the Act aside, and look to the tenant for their money; and there was no reason why they should not have continued to do so. In this instance, his tenant (now deceased) had occupied the house for 32 years, and had always paid the rate in her own name. She was a lady of means, and had left a will appointing executors; and these, he contended, should have been applied to. He had no more right to pay this debt than one due to the butcher or the baker. He might mention that he gave to the Company the names of the executors immediately the demand was made; and it should have been settled.

His HONOUR: You see the Act has made it very difficult for you to get out of the claim. It may be hard; but the words of the section are clear that you are liable for any rate due or that may become due.

Defendant: If that is the law, it is a very unjust one, and ought to be altered.

His HONOUR: With that I have nothing to do. I must find for the Company for the amount claimed.

WESTMINSTER COUNTY COURT.—Wednesday, Aug. 6.

(*Before Mr.* F. BAYLEY, *Judge.*)

Smith v. Morgan—A Claim for Water-Rate under an Agreement.

This was an action brought by the plaintiff, as owner of the premises No. 37, Old Bond Street, to recover from the defendant, who is the tenant (under an agreement), the sum of £9 10s. in respect of water-rates.

Mr. HODGSON, who appeared for the plaintiff, stated that an agreement, dated June 14, 1888, had been entered into between the parties, by which the defendant undertook to take the premises for a term of three years, at a rental of £175 per annum. The important clause in the agreement was that the plaintiff agreed to indemnify the defendant from all rates and charges in respect of the property with the exception of water-rates and inhabited house duty. The sum claimed had been paid by the plaintiff on defendant's behalf; and he sought to enforce its repayment by him.

A sum of £4 15s. had been paid into Court; but it was contended for the defendant that he was not liable for the other amount, or, if he was, that the action had been brought prematurely.

His HONOUR, having read the agreement, remarked that the word "indemnify" was fatal to the plaintiff's case; and he gave judgment for the defendant, but refused to allow costs.

Dismissal of the Dronfield District Water-Rate Collector.—Mr. George Shaw, Clerk to the Chesterfield Rural Sanitary Authority, reported at the last meeting of the Authority that he had, in accordance with a resolution passed at the previous meeting, impounded the books of Mr. J. W. Siddall, collector of the water-rates for the Dronfield district. The amount that ought to have been collected was £583 8s. 4d.; and the sum actually collected was only £277 1s. 0d.—leaving arrears of £306 6s. 10d. He had gone through the books, and there appeared to have been more received than had been handed to the Treasurer; but in consequence of the system, or want of system, on which Mr. Siddall had gone, it was impossible to say whether or not this was the case. It was decided that Mr. Siddall should be dismissed at once, and that his district should be divided.

MISCELLANEOUS NEWS.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly General Meeting of this Company was held at the Chief Offices, Horseferry Road, Westminster, last Friday—Colonel W. T. MAKINS, M.P., in the chair.

The SECRETARY and GENERAL MANAGER (Mr. J. Orwell Phillips) having read the notice convening the meeting, the report of the Directors, with those of the Chief Officials of the Company, and the accounts for the half year ending June 30 last, the principal portions of which were given in the JOURNAL last week, were taken as read.

The GOVERNOR, in moving the adoption of the report and accounts, said that with regard to the capital account the proprietors would see that the amount expended during the past half year on "buildings and machinery in extension of works" had been £36,043. This had been mainly devoted to the new gasholder-tank and a new retort-house at Beckton, and to a retort-house and accompanying apparatus, purifiers, &c., at Kensal Green. The balance of £249,139 to the credit of capital account represented the working capital, and consisted mainly of undivided balances. As he mentioned at the last half-yearly meeting, they had for some time past been working very short of capital; and he then told the shareholders that it would be necessary in July or August to raise a further sum, and indicated what method would be adopted in doing so. They required at present in all £650,000—namely, £350,000 to restore the floating capital of which they were short; £200,000 to represent the increased coal stock which they had found it necessary and desirable to have upon their premises in order that there should be no doubt whatever that they would be able to keep pace with the public demand for gas under any circumstances; and £100,000 they would require for the works in hand to which he had referred, and on which they had spent £30,000 during the past half year. He might say, as to the Company's capital powers generally, that they had power to raise stock which, with the premiums added to it—and no doubt the stock would command such premiums at auction—would give them about £3,000,000. Beyond the £650,000 for which they were now asking, they would require, to complete the works during the coming year, probably another £250,000 or £300,000; leaving themselves with practically £2,000,000 of unissued capital at command. He did not think they would have to ask for any further capital for a considerable period. It was a long time since they had raised any money. The new capital would be obtained, as he stated at the last meeting, on what the Directors considered to be the most advantageous terms—terms producing the highest premiums, and costing the Company the smallest amount for interest. It would be issued as 6 per cent. stock, and would involve the payment of about £26,000 a year for interest; and he believed it would bring them in the amount he had mentioned. Turning to the revenue account, he remarked that the shareholders would have been prepared for what was stated in the report—a very large increase in the cost of coal and wages. With very little variations in other departments of their work, they had had to spend about £200,000 more on coal and wages, of which £124,000 was on coal. Distribution had cost £4000 more; and their gas had brought in £1600 less—a matter to which he would refer later on. Sundries had cost them £19,000 more; and sulphate of ammonia had produced £11,000 less. Adding all these figures together, the proprietors would find a total against them of £238,000 for the half year. But, on the other hand, they had received £6000 more for coke, £1000 more for breeze, and the not inconsiderable sum of £30,000 more for tar and tar products. Thus the balance against them on the half-year's working was reduced to £201,000, as compared with the corresponding period of 1889. This sum was represented practically by the two items of coal and labour. The price of coal in the past half-year had been 14s. 7·37d. per ton, as against 12s. 36·8d. per ton; or, allowing for the products, the net cost of coal per ton had been 5s. 6·63d. in the past half year, against 3s. 7·15d. in the June half of 1889, or, as nearly as possible, 2s. per ton more. Rates and taxes had, for the first time for many years, been slightly lower. The causes of the increased cost of coal were stated in the report—mainly the increased demand which had arisen from a fluctuating state of trade, which during the past two years had been very brisk. This and the additional cost of production had enabled the coal-owners to ask higher prices than they did when trade was slack and wages were lower. A third cause of the increased cost was that there had been less coal for sale; the output having been diminished by the action of the miners. The increased cost of mining, labour, and materials must also be added to these causes. Of course, if trade slackened again, they would probably have cheaper coal; and he had no doubt that this would be the case sooner or later. In the meantime, they had done their best, looking at their great responsibilities, to obtain their coal on the most advantageous terms. They had had the benefit, for some years past, of cheap coal. When the somewhat sudden rise in the price took place, they considered their position, approached their sources of supply, and arranged with them for what he might term a "mixing price" for their contracts, by foregoing some period of low-priced coal, and giving those who supplied them less than they had quoted and less than the market quotation for the coal they had purchased forward. They were now contracting up to the end of June, 1891. Some of their contracts were very much behindhand; but, by reason of their having taken precautionary measures, he had no doubt they would get through the winter without the serious deficiency of coal at the works which they had to face last year. He believed the shareholders would agree with him that it was not only a prudent policy, but that it was incumbent on them, looking at their responsibilities, to have placed themselves in this position. He also believed they would consider that the causes of the diminution in the profit, to which he had referred, had been entirely beyond the Directors' control. Gas, like every other commodity, could only be made cheaply when materials were cheap. They could not charge themselves with any neglect whatever in what had taken place in regard to the cost of materials; and they had reason to believe that the same state of things had prevailed in every other gas company in the kingdom, as well as in those gas undertakings which were

conducted by municipal authorities. In order to provide for the extra cost of coal and labour, the Directors had raised the price of gas as from the 1st ultimo. They had been criticized somewhat for having reduced the dividend this half year, when the price might have been thought to warrant 13¾ per cent.; but, by the construction of the Act and the decision of the Board of Trade Auditor, they had found that it would be very questionable, if not absolutely wrong, for them to declare a higher dividend for the past half year. They might have split it up into fractions, and so paid a little more; but this would have involved considerable trouble in keeping the accounts, and probably would have created more confusion in the minds of the shareholders than the small amount would have benefited them. From the beginning of last month the price of their gas would be 2s. 9d. per 1000 cubic feet—3d. more than before; and this involved a reduction of dividend by ¾ per cent. They had also been blamed by some critics for having ever raised the dividend to 13¾ per cent. It seemed to be argued that, though they had very large balances, which practically compelled them to reduce the price of gas, they should have done this, but not have increased their dividend. He, however, held the opinion—and he believed he was supported in it by the other Directors—that the shareholder for the time being was equitably entitled to his proportion of the profits during the time he was a shareholder. They would reduce the price of gas as soon as they possibly could; and when they did so they would increase the dividend to a corresponding extent. This was the policy which the Directors had always tried to carry out strictly. When this matter was written about in the Press, a very important thing was overlooked. A penny per 1000 cubic feet meant £70,000 a year to the consumers in the district supplied by the Company; and therefore a reduction of 3d. per 1000 cubic feet gave them £210,000 a year. On the other hand, ¼ per cent. of extra dividend, corresponding to a reduction of 1d. per 1000 cubic feet, only came to £14,000 for the shareholders, or, for 3d. per 1000 cubic feet, £42,000. Therefore, the benefit to the consumers was exactly fivefold what the shareholders obtained. For the first time for many half years they had had an actual, though a very slight, decrease in the quantity of gas sold. This was entirely owing to the very extraordinary climatic conditions prevailing in the early part of the half year under review. He had a table showing the average increase or decrease of the gas delivered from the year 1884 down to the present time, and he found that the average increase for January over the seven years had been at the rate of 2·8 per cent. Last January, however, instead of having this increase, they had a decrease of 5·4 per cent.; so that there was a difference, as between the actual average delivery and the actual quantity distributed of no less than 7·12 per cent. against the Company, and this for the very heaviest month of the year. On the other hand, they had for the month of June last an increase of 10·8 per cent. This was very remarkable; but it did not count for much, because June was probably the worst month for them, whereas December and January were the best months. The proprietors might set their minds at rest as to any fear that might be entertained that the falling off had been due to competition by the electric light or anything else. It had been simply owing to the weather; and he would be very much surprised indeed if the experience to which he had referred was not borne out by what had occurred in the case of other gas companies. He believed that in the present and forthcoming half year, if they had anything like the usual average weather to which people were accustomed in this most changeable climate, to get the increase they had provided for at Beckton and elsewhere of five million cubic feet per diem, would very probably all be required, at least on certain occasions in mid-winter. It was unfortunate that the decrease in the quantity of gas sold should have come on the top of an increase in coal and wages; but they ought not to lay this very much to heart. Their business was, in fact, increasing in the usual ratio. They had had 1200 new public lamps in the half year, which meant something like six or seven miles of new streets, which again meant a good many new customers; and this was borne out by the fact that they had 38,920 new lights, and 3288 new meters. This did not look like stagnation in their business. The supplies to small dwellings had increased from 1676 to 2144. The number of gas-engines—those they knew of—had augmented by 97; and gas-stoves had increased from 15,998 to 21,461. The stove trade was, as he had often said, one of the most hopeful features of their future prosperity; and the use of gas for fuel was now an established fact. A most remarkable circumstance had come to light in the course of the past half year—one which would certainly be scarcely credible but for the evidence he had before him. It showed that a rise of temperature—that was to say, a very hot day in summer—had increased the output of their gas. This would seem to be almost a contradiction in terms; but it was explained in this way: When the weather was very hot, people put out their fires, and lighted up their gas-stoves for cooking and other purposes. With reference to the labour question, with occasional slight differences which had been capable of adjustment, they had maintained, on the whole, thoroughly good relations with their workmen. They had settled with them a monthly agreement which had been signed by 3959 out of a total of 5196 employees; and as to the remaining 1237, fresh signatures were being put to the agreement daily. Some of the men were also away on their holidays. He believed, however, before many weeks were over the whole of their men would be under this monthly agreement. It was settled as the result of due consideration, and after conferences with the representatives of the men—both of those who belonged to the Union and those whom he might term the "free labour party;" and he believed it was an agreement which gave satisfaction to the men, and would be of great use to the Company. The Directors had adhered most strictly to their policy, which they had adopted from the beginning, of non-interference with the men's liberty to join or abstain from joining the Union. All they required was that those who did not join it should not be placed at any disadvantage by those who did. They would never seek to coerce labour in any other way than this. On the other hand, they would not hesitate, should the necessity arise, to invoke the civil power to protect those of their men who did not belong to the Union against those who did. He believed that nothing of the kind was likely to arise. Everything the Company could do to provide the men with means of recreation and improvement had been carried out at the works; and the best sanitary appliances had also been adopted for their comfort. With regard to the subject of water gas, which he mentioned at the last half-yearly meeting, they had made some progress. They would have at Beckton plant for producing about a million cubic feet per diem; and at Silvertown they would be able to produce about half a million cubic feet daily next winter. In case of any sudden demand for gas, this would *pro tanto* be of great advantage to them. He was reminded by the Deputy-Governor of an additional advantage from the possession of this plant; and that was that if there was any deficiency of cannel coal—and the shareholders were probably aware of the fact that cannel was becoming scarcer every day—the water gas was of very high illuminating power, and would enable the Directors to maintain their relations with the testing authorities. They had coal-gas plant for an increase of 5 million cubic feet per diem at Kensal Green, Nine Elms, and Beckton. As to the unfortunate dispute with the South Metropolitan Company, in connection with the supply of gas at the Nine Elms Station of the South-Western Railway Company, it had been brought to a conclusion by the award of Mr. H. E. Jones, the Special Referee appointed by the Court to assess the damages. Some anxiety had been expressed by the representatives of the South Metropolitan Company that they (The Gaslight and Coke Company) should abandon this claim, in consideration of the great services which that Company, through their Chairman and Directors, had rendered to the gas industry as a whole. He (the Governor) had pointed out more than once—he believed at the last half-yearly meeting—that they had no right to deal with the shareholders' money in this way, or to forego any such claim. They might have had a right to compromise the matter when it was still in dispute; but having been disputed and settled, it formed part of the profit of the Company, and it would require the unanimous vote of the shareholders, present or by proxy before they could employ a shilling of the money in question for any purpose whatever. He sincerely trusted that the whole thing might be allowed to rest where it was. It was an unfortunate dispute from the beginning. It was a matter of principle, which the Company were bound, in the interests of the shareholders, to carry out. They contested it, they had carried it through, and had gained the verdict and the justification for their action; and he thought the sooner the whole thing was closed up the better it would be for all. As far as the Chartered Company were concerned, and certainly as far as he personally was concerned, the question, though necessarily a painful one from its character, had never caused any want of amicable relations between the two Companies. It was a hard, dry matter of business. Referring to the current half year, he stated that the same causes would operate with respect to coal and wages as in the past half year; and he thought they could not hope to spend very much less than £200,000 on these accounts. On the other hand, the rise of 3d. in the price of gas would give them about £110,000 more. They hoped to get £30,000 or £40,000 additional from coke, and perhaps £10,000 more from tar—say, £150,000 or £160,000. Therefore, at the end of the half year, it would probably be necessary for them to "tap" their reserve fund to a limited extent—a process which might have to be repeated in the following half year. He believed, however, that then they would be getting pretty well to the bottom of it, and after this he hoped they would speedily replace what they might take from the reserve fund, and that before long they would be able to remit the advance of 3d. in the price, and restore the dividend to the rate of 13¾ per cent. All the officers and staff had, as in previous half years, worked most zealously for the good of the Company. They had had a few reorganizations in the distributing staff and in other ways, which had resulted not only in increased efficiency, but in considerable economy to the Company. He believed that their prospects, in spite of the coal and labour cloud, were, if not brilliant, at any rate satisfactory; and he considered that anyone who, owing to a feeling of momentary depression, parted with his holding in the undertaking at a reduced value, was not very wise.

The DEPUTY-GOVERNOR (Mr. H. C. Ward) seconded the motion.

Mr. GEORGE LIVESEY said he felt bound to make a little correction in the Governor's speech. He had stated that representations were made by the South Metropolitan Company that, in consideration of the great services rendered by them at the time of the strike, the Chartered Company should forego their claim. This was a mistake. No one on behalf of the South Metropolitan Company ever made such a suggestion. The representation was made entirely voluntarily by shareholders at the last meeting of the Chartered Company. At that meeting the shareholders expressed themselves very strongly on the matter, and said it would be a gracious thing to drop the claim. He (the speaker) did remind the Governor, two or three weeks ago, of what the shareholders said on the occasion in question; and he then expressed a hope that the views of the shareholders might be carried out. The feeling was so cordial at their last meeting, that he thought they would hear no more about the matter. The Governor had said something about the supply to the South-Western Railway Company being a matter of principle; but it was just as much a matter of principle with the South Metropolitan Company.

The GOVERNOR: Hear, hear.

Mr. LIVESEY (continuing) said the trouble arose through the Chartered Company refusing to give the Railway Company the discount the South Metropolitan Company had been allowing for many years. The Railway Company then applied to the South Metropolitan Company; and they felt bound, according to the law and the Act of Parliament, to give the supply then asked for. The Court of First Instance and the Court of Appeal both gave judgment in favour of the South Metropolitan Company; but this had been reversed by the House of Lords, which had restricted the meaning of the Act of Parliament and restricted the rights of the consumer. With reference to the strike, the difficulties of the South Metropolitan Company were very greatly increased by the position and action of the Chartered Company. The Gas Workers' Union began at Beckton. The men demanded greater facilities for going to and from their work; and from that demand arose the Union. The difficulties in which the Chartered Company were placed were known. The Directors of the South Metropolitan Company knew that the Chartered Company were not then in a position to fight the Union, and their difficulties and their expenses were greatly increased

from this fact. However, he considered all this wiped out by the friendly feeling expressed by the shareholders at the last meeting, from which he himself went away thinking that the whole thing was past and gone—that all ill-feeling had disappeared; but he was sorry to be obliged to say that the agents of the Company, in making their claim for damages, had shown that he was mistaken. It cost the Chartered Company during the three years more than 1s. 6d. per 1000 feet to make the gas; but, for the purpose of assessing the damages, their agents had said it had cost 11d. This gave the Chartered Company, on that account, instead of 10d., about 1s. 5d. per 1000 cubic feet profit. The Referee altered it to some extent, and made the cost 1s. 3d. instead of 11d.; and on that he had based his award. He (the speaker) did not want to use words to cause any unpleasantness; but he thought it right to say that, on the part of some of their agents, the friendly spirit which the shareholders had manifested had not been displayed. He himself felt that it was highly important that the two Companies should pull together, and that in these extremely difficult times they should allow no feeling of animosity to interfere with their desire to promote the general prosperity of the gas industry. He felt satisfied that had they been on what he would regard as proper terms, the labour question could have been dealt with in a more satisfactory manner, and he also believed that they might have done better in regard to coal. Two of the Companies had so collaborated, and had closed their contracts at 1s. 6d. a ton lower than the Chartered Company.

The GOVERNOR asked for a comparison of prices.

Mr. LIVESEY said that the prices were about 11s. The Chartered Company had bought at about 12s. 6d.; but this was possibly somewhat reduced because they had given up part of their old contracts. At any rate, he believed that they could all have done better had they acted together.

The GOVERNOR said that the Company's coal was bought to be delivered at Beckton. Was not the South Metropolitan Company's supply bought at the pit's mouth, to which freight had to be added?

Mr. LIVESEY said they had bought some at less than 11s. per ton. What, however, he wanted was that the two Companies should be on friendly terms; and he must say that the way in which the matter in question had been dealt with gave them the impression that there had been a very bitter feeling shown somewhere towards them, though he did not say it was on the part of the Directors. There was someone behind the Board—he did not refer to Mr. Phillips—who had acted in a very unfair manner.

The GOVERNOR, in replying, said he did not think it would be desirable to go into the question again, as the thing had been settled after a hearing of both sides, and they could not alter it. The House of Lords was the Supreme Court of the land; and it was of no use traversing their judgment. The orders of the Directors to their representatives were that the case before the Arbitrator was to be carried on in as courteous and amicable a manner as possible. In fact, he believed he expressed himself that it ought to be dealt with more like a marriage settlement than as a contested claim, and that everyone should try and settle it. He had carefully read through the minutes of the evidence of the inquiry before the Arbitrator; and he had found that two out of every three pages were taken up with bickerings by Counsel. For this they could not hold themselves responsible. He assured Mr. Livesey that there had been no feeling against him or his Company, and there never had been. He (the Governor) had repeatedly said they had only one interest at heart with the other Metropolitan Gas Companies; but they were responsible to the shareholders, and they must do their business in a way that they thought right for their interests. As far as an interchange of ideas went, or as regarded the conveying of information, they were most willing to afford it and to receive it; but to enter into any combination for buying coal or dealing with labour was quite beyond the province of the Board. For the rest, he hoped with Mr. Livesey that they would be able to assist each other, because their interests were the same.

The motion was then put, and carried unanimously; and the dividends recommended were next approved.

The GOVERNOR then proposed a resolution authorizing the creation and issue of the sum of £476,000, of 6 per cent. preference stock. He thought that if the proprietors compared the terms with the debenture stocks and preference stocks bearing a like interest in railway and other companies and saw what a margin of profit there was over and above the amount required, they would find the stock valuable for trust purposes or investments of a permanent character.

The DEPUTY-GOVERNOR seconded the motion, and it was carried.

On the motion of Mr. BURLS, a vote of thanks was passed to the Governor and Directors.

The GOVERNOR, in reply, assured them that they had had anything but a comfortable half year. In fact, the last two half years had been the most troublous ones he had known in connection with the Company for 25 years. The Company, however, had never failed to supply the public with gas of proper quality; nor had they failed, so far as he knew, to fulfil any other of their obligations.

The proceedings then terminated.

Grantham Gas Company.—The half-yearly meeting of this Company was held last Tuesday—the Chairman (Dr. J. W. Jeans) presiding. The Directors in their report recommended the payment of the usual dividends of 5 per cent. on the old, and of 3½ per cent. on the new shares, for the six months ending the 30th of June last. The Directors stated that, notwithstanding early action and a good deal of care and correspondence with the different colliery proprietors, they had been compelled to make their contracts for coal at a considerable advance on last year's rates. The Chairman briefly alluded to the recent gas exhibition, and stated that the Directors considered it extremely satisfactory—nearly 40 cooking-stoves being at the present time out on hire. He also referred to the rise in the price of coal; and said the Directors had seriously under consideration the question of raising the price of gas in the borough. Other towns had already done this; but they would avoid it if possible. The usual votes of thanks to the Chairman, Directors, and officers brought the meeting to a close.

BRENTFORD GAS COMPANY.

The Ordinary Half-Yearly Meeting of this Company was held at the Charing Cross Hotel last Friday—Mr. H. C. WARD in the chair.

The SECRETARY (Mr. W. Croxford) having read the notice convening the meeting, the report of the Directors and statement of accounts, a summary of which appeared last week, were taken as read.

The CHAIRMAN then moved—"That the report and accounts be received and adopted, and entered on the minutes." He said that for once in the history of the Company the Directors had had a very anxious half year; and they met the proprietors with not quite so flourishing an account as that to which they had been accustomed. But all people who were in any way connected with the gas industry, or with gas companies, knew very well that the events which had come upon them rather suddenly, and very seriously in the past half year, beginning before last Christmas, had been very much felt by them as well as by all companies throughout the United Kingdom. There were only two items which marred the beauty of the accounts. These were the items of coal and labour. When he told them that the market price of coal had really increased about 25 per cent. and that that of labour had advanced between 30 and 35 per cent., the proprietors would not, of course, be astonished that a very considerable inroad had been made into the half-year's profits. It was because of this circumstance that they had been obliged to give notice, as from July last, of their taking a step backwards, in the way of increasing the price of gas by 2d. per 1000 cubic feet, by which they had reduced it twelve months ago. He thought that their friends the consumers would perfectly well remember this, that, although they reduced the price by 2d., as no other company that was regulated by the sliding scale had done, they had not made a profit during the half year which would provide for the increased dividend under the sliding scale. They maintained the dividend at 12½ per cent. as before; and therefore now, when they increased the price again by 2d.—which was a small increase amounting to not more than 6 per cent. of their price, whereas the market price of coal had gone up 25 per cent., and labour more than 30 per cent.—he thought that nobody could complain, and generally speaking nobody had complained of the action taken by the Directors in this respect. The report referred to the sale of £25,000, new stock, 1881, which they were authorized to raise at the last half-yearly meeting. £25,000 was put up; and he was happy to tell them that the amount realized was £39,687 11s. 3d., or a profit of £14,687 11s. 3d., which went to swell the premium capital. They must understand that their labour and coal troubles had not been confined to their own works, but had also applied to the pits; and however good their contractors might be, and however anxious they might be to keep them supplied with coal, they could not of course do so if the men struck work, and would not produce the coal. This had naturally given them a very great deal of anxiety; but as it had been met by the usual activity of the Company's officers—especially by Mr. Morris—they had pulled through and done their duty to the consumers. Of course, it had been accomplished at an increased cost. They had also been obliged to enter opposition in Parliament. Their friends at Twickenham and Richmond had been getting a new weir and trying to dam the Thames to get more water above Richmond Bridge. But the Directors had been obliged, in the interests of the Company, to oppose this measure. Other riparian proprietors—such as the Duke of Devonshire, the Duke of Northumberland, the Brentford Local Board, and last, but by no means least, the Thames Conservancy themselves—had also done their best to oppose it. The Company had done so, tooth and nail, both in the House of Commons and the House of Lords. However, the Bill had passed; and, as a *solatium* for their efforts, a compensation clause had been inserted which would give them compensation in case of any real damage that might happen to their property, and he hoped that no injury would occur to it beyond that for which they were entitled to receive compensation. They had been very active in making arrangements for the future—for increasing and improving their manufacture during the coming year. They had been building a new tank for a gasholder very much larger than any they had at the works at present; and it was making considerable progress. They had been very active, and were so still, in introducing a new system of carbonizing by inclined retorts, which, it was to be hoped, would be of great benefit both to the Company and the public, and enable them in some sort of way to redress the great increase in the cost of labour which had been going on for the last few years. They had been working very much with a view to the production of a certain quantity of water gas, which would be enriched by oils to give it a high illuminating power. It would be of great service to them as a substitute for cannel gas, as cannel coal was becoming dearer as it was getting rarer throughout the country. After these remarks, he could only call the shareholders' attention to the revenue account, where they would find that there was an increase of £1900 odd in the cost of coal; in carbonizing wages, of £3300; in wear and tear of machinery, of £1500 odd—the increase was all where labour came in, they would see—and in distribution, &c., of £349, making a total of £7182. This was a larger amount by £6672 than the deficit in the profit to pay the 12½ per cent. dividend; and it had only been by the very best management on the part of the officers that they had been able to meet these financial trials during the past half year. If they would analyze the account they would find that in almost every item there was a wonderfully good result in point of manufacture, in spite of the fact that labour and the price of coal had not been what they used to be. The gas made per ton had been 200 feet more than in the corresponding period of the previous year. Looking at things altogether—although they did not expect that they were "out of the wood" yet with regard to these labour troubles—he thought there was good promise for the future.

Mr. J. ORWELL PHILLIPS seconded the motion, which was carried unanimously.

The CHAIRMAN next moved—"That a dividend for the half year to June 30, 1890, subject to income-tax, at the rate of 5 per cent. per annum on the 5 per cent. preference stock, at the rate of 12½ per cent per annum on the consolidated stock, and at the rate of 9½ per cent

per annum on the new stock, 1881, be now declared; and that such dividends be payable on the 1st day of September next."

Mr. PHILLIPS seconded the resolution, and it was carried.

Mr. R. HESKETH JONES proposed a vote of thanks to the Chairman and Directors for their able management of the Company's affairs during the past half year, as well as to the Engineer, Secretary, and staff, for their zealous attention to their respective duties.

Mr. GIVENS seconded the motion, which was carried unanimously.

The CHAIRMAN returned thanks; and said that while the Board had had considerable anxiety during the past half year, it had been very much alleviated by the great assistance they had received from all their officers, more especially the principal one—the Engineer.

The proceedings then terminated.

SOUTH METROPOLITAN GAS COMPANY.

The following is the report of the Directors of the above Company for the half year ended June 30 last, which, together with the accounts (to be given next week), will be presented to the proprietors at the meeting on the 20th inst.:—

The accounts of the last half year, like those of the immediately preceding six months, are adversely affected by the strike of the stokers on Dec. 13 last. Although the strike was over as soon as the new men on the second day proved their ability to make a sufficient quantity of gas to keep the district supplied, the strikers continued for two months by all possible means to harass the Company and its men; necessitating the continuance of heavy expenditure on food and labour for five or six weeks in the new year. The general expenses also have been considerably higher, particularly the items of repair and maintenance, and distribution, caused by finding employment of various kinds for many of the new men, when they were no longer required in the retort-houses, large numbers of whom, at the Company's request, had brought their families from the country and settled near the works. Consequently, it was considered a duty to provide work for as many as possible during the summer, and thus have the men ready for the retort-house work when the demand for gas increases with the shortening days. In addition to finding employment for the new men, the Directors have, as far as lay in their power, found work for the old stokers, whose case is, in many instances, most pitiable; numbers of them being left by the Union, with their wives and families, to starve, after having parted with everything from their former comfortable homes. These facts are named for the purpose of explaining the heavy increase of expenditure under various items; but this is not to be regretted, because, above all things, it was necessary to recover the control of the business, and to prove, in a practical and forcible manner, to the men that they might safely trust their employers.

Owing also to the strike, there has been a greater increase in the cost of coals than would otherwise have been the case. A high price was paid for Yorkshire coal brought by rail, in consequence of the threatened interference with the supply by sea. In fact, neither money nor anything else was spared to ensure success, with the result that, although the anxieties and difficulties were great, it can be seen, on looking back, that there never was any real danger of failure; and in the most improbable event of another strike, it is certain it could be dealt with successfully by a very moderate expenditure.

Having thus dealt at length with what is unsatisfactory in the accounts (which is only temporary, and, so far as the strike and its consequences are concerned, is at an end), there are two points of special importance that will doubtless give great satisfaction.

In the recollection of all the officials of the Company, never before did the men work in such a good spirit, or do their work so well and cheerfully, as at the present time. This applies equally to the old hands who were loyal, to the new men, and to the old stokers who have returned to work. So far the profit-sharing scheme, which was introduced last year, and was the ostensible cause of the strike, has proved a greater success than could have been anticipated. All the men are working under agreements for various periods, ranging from three to twelve months, terminating at different dates, which they have signed voluntarily. In fact, as participating in the profit-sharing scheme is conditional on working under agreements, the difficulty is not to induce them to sign, but to find employment for all who wish to do so. The amount of the bonus credited to the men on June 30 last was £5821. In the succeeding years it will be considerably more, because a large proportion of the men this year have only been in the employ of the Company since the date of the strike.

The other satisfactory point is the good-will of the consumers towards the Company, manifested in the very practical manner of increasing their consumption. As large numbers of consumers of all classes in all parts of the district—manufacturers, tradesmen, and private persons—purchased lamps for the purpose of helping the Company during the crisis of the strike (in many cases burning no gas whatever), it was feared that when the full supply was restored they would continue, at least partially, to use these lamps. But this cannot be the case to any appreciable extent, because, from the time when the full supply was resumed, the increase of consumption has been at the rate of 5·12 per cent. over the corresponding period in the previous year, which is solid ground for confidence in the prosperity of the Company.

It is also satisfactory to report that the demand for gas-stoves continues to increase. The number of additional cooking-stoves sent out in the half year was, after deducting those returned, 2612, and the total number now on hire is 13,864. The total number of consumers is 72,879; therefore 19 per cent. have gas-stoves on hire, in addition to a considerable number who have stoves of their own.

To meet the increased consumption, which shows no sign of abatement, constant extensions of plant are necessary. At one time it is a large retort-house, purifiers, &c., which have just been completed; then additional storeage has to be provided, and larger mains have to be laid; the first five-lift gasholder that has ever been built is just completed at Rotherhithe. It has been designed for the purpose of utilizing an old cast-iron tank 81 feet in diameter by 20 feet deep; and the contents are 424,000 cubic feet. Also a contract has been made for doubling the largest holder at Kennington, and thus increasing the storeage at that station by 3 million cubic feet; and at East Greenwich a new tank, 300 feet in diameter by 30 feet deep, is being constructed by the Chief Engineer—a contractor being dispensed with in this case, partly to give employment during the summer to the stokers who would otherwise have had to leave. This tank is for the reception of a six-lift gasholder, to contain 12 million cubic feet.

Reference must be made to the very serious rise in the price of coals; averaging nearly 5s. per ton over that of two years ago. This additional cost will be partly met by the higher value of coke and the abolition of the coal dues; but the Directors hope that, by making use of the reserve fund, they may tide over the period of inflation without raising the price of gas.

The Directors again recommend that a dividend of 12 per cent. be paid instead of 13¾ per cent., which, under the sliding scale, might be declared. This dividend will be apportioned as usual, in accordance with the Scheme of Amalgamation, which will give to the "A," "B," and "C" stocks the same dividends as they received last February.

The direct expenses of the strike, as shown in the accounts, are £31,978. To meet this the shareholders, if the dividend recommended be adopted, will give up £15,000, and £15,000 will again be taken from the insurance fund, which is authorized by Parliament to be used to meet the losses caused by strikes. The indirect losses and expenses will be borne by the reserve fund. It must be remembered, however, that since the Standing Order of 1876, passed at the instance of the Board of Trade, of which Sir Thomas Farrer was then Secretary, Parliament has required all new capital to be sold by auction. Therefore on such capital the dividend is only nominally one of 12 per cent., yielding, as it does at the present market prices, only about 5 per cent. to the investor; the premiums obtained by the sale of stock forming part of the capital of the Company, without interest.

The Lighting of Courts in Manchester.—At the monthly meeting of the Manchester City Council last Wednesday, under the presidency of the Deputy-Mayor (Sir J. J. Harwood), Dr. Simpson drew attention to the question of lighting the courts and alleys of the city, and said it would be a misfortune if something was not done before the winter set in. The Deputy-Mayor said the matter looked exceedingly simple, but it was in reality a complicated one—that of lighting private property at the public expense. It was a new departure, and had to be undertaken with much care. The report of the Officer of Health in relation to the matter had been referred to the Chief Constable, and he had it under consideration. There were, no doubt, some passages and alleys which, in the interests of public health and morals, it would be an advantage to the public to light; but if the proposal were carried out suddenly and thoughtlessly, it might cause a great deal of inconvenience, and perhaps litigation. They could not do anything without the permission of the owner of the property. Dr. Simpson and the Council might rest assured that the matter would be carried out with the utmost care, and that justice would be done to all parties.

Bingley Gas Supply.—According to some comparative statistics of the working of the gas undertaking of the Bingley Improvement Commissioners in the past financial year, compiled by the Gas Engineer (Mr. G. Dunbar Malam), the gross revenue in the twelve months ending March 25 last was £10,995, as compared with £9129 in the previous year—an increase of £1866. The expenditure was £7009, as against £5535—an advance of £1474. The gross profit was £3986, as compared with £3594; being a rise of £392. The interest paid upon loans last year was less by £74 than in the previous twelve months. The surplus revenue, after providing for interest, sinking fund, and renewals, was £1250. The amount of loans repaid to the end of the past financial year was £19,665; leaving £30,302 still to be cleared off. Coming to the manufacturing operations, we find that the quantity of gas sold in the twelve months now under notice was 55,890,200 cubic feet, as compared with 53,805,000 cubic feet in 1888-9—an increase of 2,085,200 cubic feet. The gross price was 3s.; but the net price averaged only 2s. 5¾d. per 1000 cubic feet. There was a slight increase in the leakage (0·29 per cent.); the figures for the past year being 5·43 per cent., as compared with 5·14 per cent. in 1888-9. But the quantity of gas unaccounted for is still very low.

York and the Bradford Water Bill.—The Ouse Navigation Committee of the York Corporation stated as follows in the report submitted by them to the quarterly meeting of the Council yesterday: "Your Committee have satisfaction in reporting that, in consequence of the opposition offered by themselves and others to the proposals embodied in the Bradford Corporation Water Bill of the present session, the Bill was considerably amended, to the advantage of the city, in its passage through Committee in each House, as the following summary of the practical results of the combined opposition of the Bill testifies: (1) Bradford having proposed to appropriate for their own supply a drainage area capable of yielding a flow of 36 million gallons of water per day, are allowed to take 17 million gallons only from that area. (2) A storeage reservoir, with a capacity of 1510 million gallons, was proposed as compensation for the entire yield of the area referred to. This is to be given as compensation for the diversion of less than half the yield, or 17 million gallons a day only, as above indicated. (3) The plans deposited did not show a reservoir of the capacity proposed. Not only has this been rectified at the instance of the opposition (who alleged that the plans showed a deficiency of 225 million gallons), but the required capacity is to be provided, 'above the discharge-pipe' from the reservoir. Provision for the last condition was not made in the original Bill. (4) The compensation reservoir was to be a millowners' reservoir. The York Corporation, the York New Water-Works Company, the Knaresborough Local Board, and three riparian proprietors, appointed by the West Riding County Council, will now have a voice in the management, equivalent to 72 votes in all. (5) In addition to the special discharge from the compensation reservoir, which the Board of Management may order to be sent down the River Nidd, there is to be a daily minimum discharge of 5 million gallons, or 1 million gallons in excess of the extreme dry-weather flow of the stream at the lowest point affected. (6) So long as there is a sufficiency of water in the reservoir in any one day to discharge 5 million gallons, the Corporation of Bradford will be responsible if this quantity is not sent down."

SALFORD CORPORATION GAS SUPPLY.

The Annual Report of the Gas Committee—The Cost of the Strike.

At the Quarterly Meeting of the Salford County Council last Wednesday, the annual report of the Gas Committee was presented. It is stated that the gas made during the year ending the 25th of March last amounted to 857,770,000 cubic feet, of which 857,745,000 feet were issued from the works, as compared with 944,708,000 cubic feet made and 944,414,000 feet issued in the previous year; the respective decreases being 86,938,000 cubic feet, or 9·20 per cent., and 86,699,000 cubic feet, or 9·18 per cent. The average illuminating power at all stations had been equal to 18·78 standard sperm candles; the parliamentary standard being 18 candles. The rental from private customers amounted to £87,912 9s. 5d.; from public lamps, to £8562 13s. 5d.; from meter-rents, to £3351 5s. 6d.; and from stove-rents, to £23 17s. 2d.—making a total of £99,850 5s. 6d. This was a decrease of £20,535 12s. as compared with last year. During the past year the Committee laid an additional 1423 yards of new mains; also 2694 yards of new mains which replaced others of less dimensions. The amount of coal and cannel carbonized was 75,122 tons and 15,932 tons respectively; the proportion of cannel being 17·50 per cent. The average yield of gas per ton of coal was 9420 cubic feet. The gas used on the works and in the offices during the year, also at the gas-stove exhibition in Peel Park, and for cooking during the strike, amounted to 11,840,900 cubic feet; being 1·38 per cent. of the gas made. The loss by leakage decreased from 13·70 per cent. in 1889 to 10·95 per cent. in 1890. The amount of bad debts was £529 5s. 5d. The gross profit was £34,213 18s. 1d., of which £26,110 14s. 6d. was appropriated to interest to depositors, to the redemption fund, to the depreciation fund, &c. The remaining £8103 3s. 7d. constituting the divisional profit, had been apportioned as follows, proportionately to the consumption of gas in each district: Salford, £4445 2s. 8d.; Pendleton, £1973 9s. 10d.; and Broughton, £1684 11s. 1d. The Committee reported that, owing to the increase in the wages of the workmen, the cost of coal, fire-bricks, and other materials used in the works, and the expense and loss incurred, directly or indirectly, in consequence of the strike, the result of the year's working had been largely affected, and the balance of profit greatly reduced. The reduction of 4d. per 1000 cubic feet in the price of gas, which was made at the commencement of the financial year, had resulted in decreasing the revenue by £12,532. There had been a great falling off in the quantity of gas sold, amounting in value to £8090, owing principally to the strike of the workmen reducing the output during the busiest season of the year. The increased rates of pay and shorter hours of labour granted to the men in October last had cost about £3000. The direct expenditure due to the strike amounted to £2864. The indirect cost, such as the falling off in the yield of gas and residuals per ton of coal carbonized, the increased repairs of plant, and wages paid for extra men engaged about the works at the time of the strike, could not be accurately ascertained, but had undoubtedly been very considerable. The coal market during the past year had shown a continual advance, but the Committee were fortunate, when the contracts were made last year, in buying sufficient for more than two years' requirements, and thereby they would affect a great saving. Notwithstanding the large decrease in the profits owing to the causes mentioned, the Committee had been unwilling to raise the price of gas, in the hope that careful management and an increase in the consumption would enable them ere long to recover their position. Owing to the improvement in the state of trade, there had been an increase amounting to £1850 in the receipts for residuals; and the Committee anticipated a still larger increase next year from this source. The sulphate plant, during the time it had worked, had answered very satisfactorily, and realized the results which were anticipated from it. It was further stated that considerable progress had been made in the alterations at the Liverpool Street works, with the view of increasing the manufacturing power and storeage. The excavation of the new coke-storing ground and the building of retaining walls had been completed; as also had the enlargement of the largest gasholder. The plans of the alteration of the retort-house had been prepared; but, in view of the extent of the work, the Committee had decided not to proceed with the whole of it this season. The demolition of the old retort-benches had been accomplished, and the erection of a range of 27 beds of larger retorts, heated by regenerative furnaces, was in progress. These retorts would be ready for work next winter, and were arranged so that they could be worked by stoking machinery when thought desirable. The engine-house, boiler-house, and boilers for the hydraulic machinery in connection with the Liverpool Street retort-house were nearly completed, and would be available next winter to supplement the existing steam power. The report was adopted without discussion.

Earls Barton Water Supply.—A scheme has been designed by Mr. W. H. Radford, C.E., of Nottingham, for the supply of water to the village of Earls Barton. As the population is only 2500, the inhabitants do not wish to carry out works involving a large capital outlay or annual maintenance. Four wells have been sunk through porous strata situate on rising ground above the village; and good water was found on the surface of a thick clay stratum at a depth of 20 feet. Neither of these wells would yield sufficient in itself to supply the village; but an ample supply can be obtained by connecting the four wells together with a collecting-pipe laid just below the surface of the clay. The length of the 9-inch earthenware socketed collecting-pipe will be 300 yards; and it will have open joints at the top of the pipe to admit water. A 4-inch iron service-main will be connected to the end of the collecting-pipe, and will convey the water to the distributing-pipes in the village. The collecting-pipe is sufficiently high in level to enable the greater part of the village to be supplied by gravitation. The part of the village which is too high to be so served has already a good supply from surface wells; but the scheme is arranged so that a small pump can be put down at any time to raise the water into a tank, which would increase the pressure sufficiently to supply this part also. The cost of the gravitation scheme to supply those parts of the village now in need of water would only be £1100, and the annual expense would be practically nil. If a pump and water-tank are added to supply the high part of the village, the extra cost would be £400.

BIRMINGHAM CORPORATION GAS SUPPLY.

The Gas Testing Question—Resignation of the Justices' Committee.

A Meeting of the City Justices of Birmingham was held at the Public Offices last Thursday, under the presidency of the MAYOR (Mr. Alderman Clayton), to consider the supplementary report of the Gas-Meter Inspection Committee with reference to the making of independent tests by the Committee of the gas supplied from the Corporation works. The matter, it will be remembered, was the subject of a long report, embodying an important statement by the Town Clerk as to the law affecting the testing of gas in the city, recently presented to the Council by the Gas Committee of the Corporation (see *ante*, p. 157), who proposed that in place of the new tests suggested by the Justices, those made at the works should be supplemented by one external test conducted at the Council House.

The supplementary report stated that since the Committee made their previous report, which was presented at a meeting of the Justices on the 16th of April last [see JOURNAL for April 22, p. 748], a letter had been received from the Mayor enclosing a copy of the report of the Gas Committee of the Council. With respect to this report, the Inspection Committee thought it right to make a few observations. In 1875, when the gas undertaking was transferred to the Council, it became legally necessary for the Justices to appoint an inspector of gas-meters. This officer was previously appointed by the Council; but, in order to secure an independent test of meters, the appointment, with power to fix the salary, was transferred by statute to the Justices. The examiner for testing the illuminating power and the pressure of the gas must also be appointed by the Justices. It was clear, therefore, that it was the intention of the Legislature to transfer to the Justices the powers of the Local Authority for the protection of the consumers when the Corporation acquired the gas undertaking. The Inspection Committee had been annually appointed by the Justices for the purpose of carrying out these powers; and their yearly reports had been approved and adopted by the Justices. On Nov. 25, 1875, a letter from the then Mayor (Mr. J. Chamberlain) was sent to the Committee, asking them to employ the inspector of gas-meters to make regular weekly tests of the illuminating power of the gas, and to report to the Gas Committee. This request was complied with, and tests were made by the inspector not only at the works but at Moor Street. It would therefore be seen that the so-called "unauthorized and irregular procedure" (referred to by the Gas Committee) originated with the Council or the Gas Department. In consequence of complaints as to the quality of the gas, and requests that it should be tested in different parts of the town, a portable photometer was in 1879 provided by the Council for testing the gas in places other than at the works; and this was done from time to time. In 1881 the Gas Committee applied to the Inspection Committee to instruct the inspector of gas-meters to test the gas at the works at Swan Village. The Committee, knowing that they could not legally pay for the performance of this duty, consented, subject to the Council paying £25 a year; and such payment had been continued to the present time. Therefore the "confusion" as to the functions of this officer was not on the part of the Justices' Committee. In furtherance of this policy of giving consumers information as to the quality of the gas in different parts of the city, a testing apparatus was, in 1888, purchased by the Committee and paid for by the Council. It was fitted up in a room at the Council House by the Gas Department (who alone were responsible for any defects in the work), and tests had been since made weekly by the examiner. In the present year the Watch Committee also provided a room in the Police Station in Wellington Road for the fixing of a similar testing apparatus, and for exactly the same purpose. This would have entailed a capital outlay of about £80 only; and it was on the application to the Council by the Committee for the payment of this sum that the present controversy had arisen. The Gas Committee now stated that testing the gas at the Wellington Road station would have served no useful purpose; but they did not suggest any alternative situation. The Inspection Committee had never contemplated the excessive expenditure mentioned in the report of the Gas Committee, and believed that tests satisfactory to the consumers could be obtained at a comparatively small cost. The Justices had already expressed the opinion that to test the gas at the works only would be wholly unsatisfactory; nor could the Inspection Committee recommend the adoption of the Gas Committee's suggestion to continue the testing at the Council House by an officer having no legal status, and under the supervision of the Gas Department. The City Council having adopted the report of the Gas Committee, it appeared that they were no longer willing to pay the costs of making tests elsewhere than at the works, and that they desired that the Justices should "provide for a complete and, if they think it desirable, a more frequent test of the illuminating power of the gas issued from the works." The Inspection Committee would, however, point out that the Gas Committee had declared in their report that the Justices had no statutory power to do this; and, further, they reminded the Justices that they had already expressed an opinion that these tests alone could not be satisfactory to the consumers. Under these circumstances, the Committee felt that they could not fulfil the purpose for which they were appointed—viz., to act as an independent authority between the Council and the consumers—and therefore they tendered their resignation, and recommended that the Committee should be dissolved.

Mr. TIMMINS moved that the supplementary report, together with reports dated the 10th of April and the 17th of July, be approved. He said that although the proceedings of the Inspection Committee went unchallenged for 15 years, they were now called "unauthorized and irregular." The Committee believed that their duties were not only to make an inspection of gas-meters, but also to test occasionally the illuminating power of the gas. Whether this was absolutely legal or not was a matter which could only be considered by a legal mind; but, so far the Committee believed, they had power to perform the task in the interests of the gas makers as well as of the consumers. The thing had gone on for 15 years; and it was not until the gas at the works was found to be of 17-candle, and that at the Council House 15-candle power that some legal luminary found that the Committee's

proceedings were not lawful. He should like altogether to disclaim that the Committee had any intention of adopting such a number of tests as the Gas Committee of the Council said, which would probably cost £2000 a year. They only desired that one or two tests should be undertaken, in order to see what was the real condition of the gas supplied to consumers. If this could no longer be done, the Committee felt that they had only one course before them, and that was to resign.

Mr. W. M. ELLIS, in seconding the motion, characterized the testing of the gas at the works as a perfect farce.

The MAYOR said it was undesirable that the existing friction between the Magistrates and the City Council on this matter should have arisen. The law required that the test should be made at the works; and Mr. Chamberlain, in 1876, arranged with the Gas-Meter Inspection Committee that it should be done at the works. He (the Mayor) could not see that the Council could be blamed for looking into their legal position on the subject. The whole thing had been inquired into, and, as the result, a report had been adopted; and he thought it a mistake for the Inspection Committee to resign. The Act of Parliament said the test should be undertaken at the place where the gas was made; and when they once went beyond their functions they were liable to get into trouble. He was sorry the Magistrates did not see that the City Council conformed to what the law required.

Mr. A. CHAMBERLAIN: Do I understand you to say the Magistrates would be neglecting the duty cast upon them?

Mr. BARRADALE replied that the Council, through their Committee, said that the Magistrates had not the power which they had hitherto been exercising, but that they had only power to make the test, in conformity with the statute, on the application of five consumers on each occasion.

Mr. A. CHAMBERLAIN said he had been quite surprised to find the friction which the proposal he first made had caused, and the opposition with which it met. His own opinion was that the opposition to the proposal came from the Gas Committee of the City Council, and no one else. It was quite sufficient for him to say that the Gas Committee were not willing that there should be an absolutely impartial test of the gas at any place outside their works. That this was illegal, expensive, and needless, were all petty details which were not worth answering. Those who were acquainted with the circumstances knew that there was a considerable demand on the part of the citizens for some authorized statement as to the real quality of the gas. What was wanted was that the gas should be of equal illuminating power throughout the whole city, and that it should be of pure quality. There seemed to be a misunderstanding as to how far the City Council represented the gas consumers. He contended that the Council were in no way whatever the representatives of the consumers. There were many ratepayers who were not consumers, and many consumers of gas who lived outside the borough. The fact was the Gas Committee of the Council were in exactly the same position as a trading company. Their business was to make money; they were a dividend-earning concern. He was sure the proposals of the Magistrates would have been in the interest of the gas consumers; and he regretted that they had not been carried out. It might now be that the consumers would meet and consider their position, or that the proposed extension of the city boundaries would offer at once a justification and a means of altering the law, so as to give to some impartial body power to test the city gas in such places as seemed to be desirable. In the meantime, there was nothing for them to do but adopt the report, and thank the retiring Committee for the services they had rendered.

Alderman JOHNSON said it was quite clear that the functions of the Inspection Committee were of very little use when cut down. While supporting the recommendation of the Committee, he thought they were much more likely to come to a good understanding if each body kept to its own strictly legal duties. If the consumers of gas were of opinion that some more efficient test than that which the Magistrates were authorized by statute to provide was necessary, the remedy lay in their own hands.

The motion was then adopted, and a formal resolution, accepting the resignation of the Committee, was afterwards agreed to.

Grantham Water Company.—At the thirty-third half-yearly meeting of this Company held last Tuesday, under the presidency of the Chairman of the Company (Mr. J. G. Thompson), the report of the Directors showed a balance on the revenue account of £3648 18s. 7d. They proposed that £1750 of this sum should be applied in payment of a dividend of 5 per cent. for the past half year, and that the balance of £1892 18s. 7d. should be carried forward. The report was adopted.

The Sewage Pollution of the Thames.—In the report of the Conservators of the River Thames for the past year, which has just been issued, it is stated that the provisions of the Acts which relate to the discharge of sewage into the river from towns and other places on its banks were enforced. The officers engaged in the inspection of the river continued to watch most carefully the condition of the water of the river and its tributaries. The sewage works established at various towns on the river and its tributaries were very closely watched, and precautions taken to prevent the possibility of any pollution escaping from those works into the river. Special reference was made in the Conservators' report for the year 1888 to the legal difficulties which have arisen in dealing with the pollution into the river from the town of Staines; and the Conservators indicated in that report the course which they trusted would enable them to abate the nuisance. To meet the difficulties in question, the Conservators have caused samples of the discharge to be taken from a very large number of houses at Staines from which pollution is passed into the river. After analysis of the samples, the Conservators served notices under the Thames Navigation Act, 1866, on the individual owners and occupiers of the various houses referred to, requiring them to discontinue the passage of sewage or other offensive matter into the Thames within 13 months—the shortest time prescribed by the Act. The Conservators' officers are still engaged in taking samples, and notices will be served in all cases where necessary. Upon the expiration of these notices, the Conservators propose to take proceedings against all those persons who have failed to comply with the requirements.

COMPETITION IN GAS SUPPLY AND ITS RESULTS.

The following is the article by Mr. Frederic Egner, of St. Louis, U.S.A., on the above subject, which appeared in a recent issue of the *American Gaslight Journal*, and was noticed in our editorial columns last week:—

Cause and effect are closely related; and like causes, operating under similar conditions, produce corresponding results. This is the truth of all things—including, of course, competition in the gas supply of cities, towns, and villages. Briefly stated, competition in gas supply will result in just two things—viz., greater cost of the gas to the consumer in the end; and making cheap gas less and less possible, according to the extent that competition is indulged in. This can be shown by quoting the ultimate results of competition in gas supply in a number of American cities. At first, indeed, the price of gas would be lowered by competing companies; but in the end consolidation would take place, and an increase in the selling price of gas would follow as a rational sequence. Because whereas, formerly, interest or dividends would have to be earned only upon the capital of the original company, now the same thing would have to be done for the additional capital invested by the opposition company; for the capital will seldom permit itself to be annihilated. The reductions in the selling price of gas, which may occur to the consumer, and which in his opinion were directly caused by competition, are in reality due to the improvements made in processes and apparatus for the manufacture of gas within the past 20 years, and in no wise to competition. On the contrary, had there never been any competition, gas would now, in most instances be sold at lower rates than was ever asked for by discontented consumers or legislative bodies in America. There would, perhaps, be rare exceptions to the above rule; but such, if there were any, could be dealt with by wise legislation, such as the Commonwealth of Massachussetts has inaugurated in establishing a Board of Gas and Electric Light Commissioners—one of the best means for protecting the interests of invested capital and users of gas or electricity for light, heat, and power, that could have been devised, as the experience of some years of work by the Commission has demonstrated to the satisfaction of the people and the companies.

A reason, which must appeal to the common sense of the consumer, why competition is sure to cause an increase in the selling price of gas, has been given; and now a few examples to prove that assertion will be related. In the City of New York proper there are now four Gas Companies; the streets are filled with duplicate, and, in some streets, even quadruplicated sets of gas-mains; and gas is sold by legislative enactment at $1·25 per 1000 cubic feet. Labour is much cheaper in New York than at St. Louis, for instance; and in the former city they have from seven to ten times as many consumers per mile of main that we have in the latter city. Yet here gas is sold at $1·18 per 1000 cubic feet, with the prospect good for an early material reduction, if the local Gas Company is left alone, and given a fair chance to show what it can or will do. At Baltimore they had one Gas Company in 1872, which gave fair satisfaction. But first one, then another, and still another, applied for and obtained Charters to open the streets and sell gas. All made great promises as to the selling price of gas; and all the usual safeguards to prevent consolidation were taken. And so they had competition, and, for a few months, very cheap gas. Then, despite all the provisions of the Charters, and all the promises made by the competing Companies, all consolidated, and to-day Baltimore is paying much more for gas than St. Louis, although the material necessary for gas making can be had at the former city at about half the price, and even less, than the St. Louis Company have to pay. Baltimore had competition; so had New Orleans, Brooklyn, and Poughkeepsie (N.Y.), and a dozen of others, with the same result as at Baltimore—viz., higher price of gas, and paying dividends on two or three gas plants when one was plenty large enough to fully supply the demand.

Would it not be better to have the gas plants managed by the municipal authorities? Certainly not; for if the honest inquirer will turn to the history of the Philadelphia Gas Trust, he will hardly advocate municipal control of gas-works. At Wheeling (in West Virginia) gas is sold at 90c. per 1000 cubic feet, and there the gas-works are managed by the city authorities. But Wheeling is located in the heart of the best gas-coal country in the world; natural gas and petroleum abound; and there is no doubt in the mind of any educated gas man that gas could be sold at 60c. per 1000 cubic feet at Wheeling if the works were managed by private business men instead of by the Municipal Corporation. At Cincinnati they have but one Gas Company. As a consequence, gas can be, and is, sold cheaply; the employees are paid good wages; the securities of the Company are valued as a secure investment; and everybody is happy. No; encouraging competition is not the best way to obtain cheap gas, except, as I remarked at the beginning, in rare cases. There may be such when a gas company refuses to improve its plant and continue onward with the rest of the world in the march of improvement; or it may be involved in other ways, making cheap gas next to impossible.

Before encouraging competition, let the people inquire if, after all, their own home company is not doing all that can be reasonably expected. Let them remember the results of competition as herein stated, which statements are the exact facts in the cases quoted. Let them remember all this before recklessly destroying that which in some—in many—instances represents the living of dependent families, who have trustingly merged their little capital with the larger one of the home gas company, and who, as a part of the local community, deserve undoubtedly more consideration at the hands of the people—their own neighbours, perhaps—than the strangers who come with great promises and in the hope of catching dollars. In the latter they too frequently succeed (all the people's fault, however); while the promises, like most promises made by that kind of philanthropists, are invariably broken, as from the nature of things they could not be kept.

The Bristol Gas Company and the Gas Workers' Union.—We learn that the Secretary of the Stapleton (Bristol) branch of the Gas Workers' Union has been made a foreman at the Avon Street works of the Bristol Gas Company.

THE ELECTRIC LIGHTING SCHEME FOR ST. PANCRAS.

As mentioned in our "Electric Lighting Memoranda" last week, the Electricity Committee of the St. Pancras Vestry have lately presented to that body an elaborate report on the subject of the scheme of electric lighting which they propose to carry out in the parish, under the advice of Professor Robinson. The Committee remind the Vestry that the latter authorized them to obtain plans, specifications, estimates, and tenders for carrying out a first installation for the supply of electricity for the purposes of light and motive power, of an extent sufficient for 10,000 incandescent lights; the mains being suitable for 25,000 lights of 16-candle power each and 90 arc lights. The Committee divided the work into seven sections, and invited a tender for each. These were: (1) Central station buildings; (2) boilers and feed-pumps, &c.; (3) high-speed engines and continuous-current dynamos; (4) switchboards and instruments; (5) storeage batteries; (6) trenches for mains; and (7) electrical conductors and insulators in the mains. The Committee recommended that tenders, amounting in the aggregate to £50,946 4s. 3d., be accepted. Although having every confidence in Professor Robinson, the Committee thought it well to submit the plans and specifications to Dr. Hopkinson, President of the Institution of Electrical Engineers, and Mr. W. H. Preece, F.R.S., Chief Electrician to the Post Office. Mr. Preece, in his report, stated that although there were several systems before the public, they were virtually reduced to two. The first was the direct continuous-current system, distributed by the three-wire arrangement; and the second the high-pressure alternate-current system, distributed in various ways. There could be no question whatever that, in districts where the bulk of the supply was within a radius of half a mile from the central station, the continuous system was the proper one; while it was equally certain that for distances beyond a mile the high-pressure alternate-current system was the best that was at present before the public. But there was an intermediate range into which local circumstances, such as a large demand for constant light and for motive power, entered; and the question of money would decide which of the two was the proper one to be used. He thought that, in selecting the direct continuous-current system, the Committee had done quite the best thing. He regarded the plans and specifications as very complete, thoroughly considered, and well worked out. Finally, Mr. Preece observed: "I think the Vestry of St. Pancras are doing a wise thing in carrying out this installation; and I see no reason whatever, from the careful consideration I have given to the plans submitted, why it should not obtain all the results that have been foreshadowed. The ratepayers will secure the light at the cheapest rate; and the profits accruing from private lighting can be devoted either to the reduction of rates or to the expense of public lighting." The Committee recommended that the seven tenders mentioned in the report should be accepted; and the Vestry, at a special meeting held last Wednesday, decided, by 47 votes to 7, to adopt the recommendation.

Reduction of Meter-Rents at Oswaldtwistle.—At the last monthly meeting of the Oswaldtwistle Local Board, it was resolved to reduce the meter-rents; the reductions ranging proportionately from 7½d. to 4d. per quarter, rents over 2s. 7½d. to be reduced half.

The Claus Purification Process at Belfast.—At the last quaterly meeting of the Belfast Corporation, a question was asked as to whether the gas purification system (the Claus process) being tried at the works had proved a success. The member making the inquiry said it was rumoured that the plant was not entirely so; new pumps having to be brought from America to remedy certain defects that had been found. Mr. Stelfox explained that the purifying vessels had proved successful so far as their operation was concerned. There was, however, great wear and tear; and they had to wait for the renewal of the pumps. These were almost ready; and the whole system would be started again in the course of a week. In reply to a further question, Mr. Stelfox gave it as his opinion that the process had proved a success; and the Mayor added that he had seen the system in operation, and all that was wanted was some slight mechanical change, which would soon be effected.

The Saltley (Birmingham) Gas-Works Hospital Saturday Fund.—The annual meeting of the contributors to this fund was held on Saturday, the 2nd inst., in one of the mess-rooms at the Saltley Gas-Works, under the presidency of the Engineer of the station (Mr. H. Hack, M. Inst. C.E.). The report presented showed that £51 13s. had been spent during the year in dispensary notes, &c., and £47 handed to the Hospital Saturday Fund. The Chairman, in moving the adoption of the report, said it was his pleasure to again congratulate the members upon the satisfactory condition of the accounts, and upon the very handsome contribution they had been able to make to the Hospital Saturday Fund, which showed an increase of £5 upon last year. They still had been able to hold their own as regarded their position on the list of contributors; for he had referred to the annual report of the general fund, and found that out of 1744 contributors theirs was but the fifteenth from the highest sum handed in—the largest sum being £209 10s., and theirs (with that of the staff added) £54, the average being £5 7s. 1d. The Chairman proceeded to contrast the collection at the works under the old system of "one annual collection" with the amount realized by the monthly payments. He showed that during the five years under the old system the donations to the Hospital Saturday Fund were but £51 0s. 9d.—averaging about £10 per annum; whereas since the establishment of the works fund by monthly contributions, five years ago, they had contributed £199, or practically £40 per annum. This was a significant change, and yet he ventured to say that not one of the contributors felt any the worse off for the additional tax on his earning. On the other hand, they had now the satisfaction of knowing that, whatever the assistance they had been instrumental in giving towards the relief of suffering under the old plan, this help had been increased fourfold. The election of officers having taken place, the proceedings concluded with a vote of thanks to the officers and members of the Committee for last year, and to the Chairman for presiding over the meeting.

THE WATER SUPPLY OF LONDON.

The Corporation Inquiry.

The inquiry instituted by the Corporation of London into the question of the water supply of the City, and the charges of the Metropolitan Water Companies, the proceedings in which have been reported in previous issues of the JOURNAL, was continued on the 29th ult., under the presidency of Sir GUYER HUNTER, K.C.M.G.

Sir *J. B. Monckton* (the Town Clerk of London) was the first witness called. He produced copies of letters, dated June 5 and July 19, which he had, by direction of the Committee, addressed to the Secretaries of the following Water Companies: The New River, Chelsea, East London, Grand Junction, Kent, Lambeth, Southwark and Vauxhall, and West Middlesex. In the first letter he informed the Secretaries that the inquiry was in progress, and in the second he invited each Company to attend by official representative, for the purpose of submitting such evidence as would comply with the expressed views of the Committee that the investigation should be of an impartial character. He said he had received acknowledgments from several of the Companies, and replies from three. The latter he read. The first was from Mr. G. B. Hall, the Secretary of the West Middlesex Company, in which it was stated that the Directors of that Company did not see the advantage of offering any evidence before a body of gentlemen who were conducting an entirely irresponsible inquiry; and it was not therefore proposed that any official representative of the Company should attend the meetings of the Committee. The second letter was from Mr. J. W. Fisher, the Secretary of the Grand Junction Water-Works Company. In it he stated that the Directors of the Company, having regard to the circumstances under which the Committee was appointed, respectfully declined to accede to the request that a representative should attend for the purpose of giving evidence. The Company, he added, would be prepared to give the fullest information before a responsible tribunal, should it be necessary to institute an inquiry at some future time into the condition of the water supply. The other letter was from Mr. G. H. Gill, the Secretary of the Chelsea Company. It was stated therein that the Directors of the Company did not see what purpose would be served by submitting evidence to a Committee conducting an inquiry which was wholly irresponsible; and they therefore declined to take any part whatever in it. The Directors regretted that a perusal of the minutes of the proceedings did not convey to their minds an impression of impartiality, so far as the inquiry was concerned at present.

Major *Lamorock Flower* was the next witness. He said he had for nearly 20 years held the position of Sanitary Engineer to the Lea Conservancy Board. For some years he was Assistant Engineer of the New River Company, and therefore was conversant with the condition of the river. At the present time the New River was perfectly pure. A great deal of the water passed through pipes; and the river was specially guarded by wharfsmen, who removed weeds and everything that was likely to interfere in any way with the stream. The water supplied by the Company was invariably good. They had ten wells from which they pumped spring water into the channel of the river. The purity of the water had been tested by chemical analysis and also by microscopical examination. There were 19½ acres of filter beds, through which the whole of the water passed before it was supplied to the inhabitants of London. For twenty years the Company stood second on the list in regard to the purity of the water they supplied; the first being the Kent Company. The New River Company did all that they could to render the water absolutely pure; and up to 1887 had expended in the improvement of their channel and works £1,945,000. There were two intakes of the water supplied to the Lea; that of the New River Company being immediately below Hertford. None of the sewage of Hertford ever entered it. In his opinion the feelings commonly entertained as to the condition of the Lea were most erroneous. People generally did not know what the river was.

The PRESIDENT: Complaints are made with reference to the Tottenham sewage. This can have nothing to do, I presume, with the intakes of the Company?

Witness: None whatever. Continuing, he stated that he had made a recent analysis of the water of the Lea below the Tottenham Lock, and he found the condition of the water exceedingly fair, and as good as when it was analyzed in 1884; so that no contamination had arisen between these periods. The sewage of Hertford had been diverted, and did not go into the New River. It, however, went into the Lea; and another source of the pollution of that river was from barges. The Hertford pollution might be remedied by legislative action. In his opinion, the water supplied generally from rivers was sufficiently good, provided that polluted matter was kept out of it. For 20 years he had had daily experience of the Lea; and he found that, although when he took charge of it it was bad, it was now all right. There was no reason for saying that the water supplied to the City was bad; on the contrary, the monthly analyses showed that it was good. He could not conceive how anyone could state that the water of the New River Company was contaminated and bad in face of the analyses. Although, as he had stated, pollution did exist in the river to a certain extent, he did not regard it as serious; and he did not consider that the water was bad. So far as the Thames was concerned, the worst pollution, as a rule, was in the head stream, over which the Thames Conservancy had no control. An officer duly appointed, as witness was, to superintend that part of the river, might remedy the evil. He proposed that the eight Companies should annually contribute £500 each, making a total of £4000 a year—a sum which he thought would fairly pay for the services of such an officer and other officials to prevent the pollution. He thought that if the water supply of London were properly looked after, they would hear very little more about obtaining water from a fresh source. The action of the Conservators of the River Lea in supervising the river had had a very particular benefit upon the water supply. There were seven elected members of the Board, and seven chosen representatives. The City was represented at the Board. It would be a magnificent thing to have the water raised from the chalk pits round the source of the Thames, intercepted, and carried by gravitation, instead of allowing it to flow down the river and become contaminated, with the necessary consequence of afterwards having it purified.

Mr. *C. Monckton*, C.E., the next witness said he thought it would be an excellent thing if some of the existing Companies were able to obtain an alternative supply by borings in the neighbourhood of the Colne Valley. He did not suggest that the alternative supply should be taken up by any other bodies than the existing Companies; but he thought it would result in giving a supply of pure spring well water instead of a possibly contaminated supply from river sources. Mr. Webster, one of the witnesses who had given evidence before the Committee, owned a spring in the Colne Valley, and had offered a supply of water to the Grand Junction Company, who had expressed their willingness to take it if they only had parliamentary powers to do so.

Mr. *W. W. Peregrine Birch*, M. Inst. C.E., said that during the last 20 years he had had a large experience in matters relating to sanitation. At the request of the Sanitary Institute last year, he made an examination of the whole subject of the water supply of London for the purpose of an address which he delivered to that body; and he was well acquainted with the subject so far as the supply obtained from the Thames was concerned. The Companies deriving their supplies from the Thames were the West Middlesex, Southwark and Vauxhall, Grand Junction, Chelsea, and East London. The West Middlesex, Southwark and Vauxhall, and Grand Junction Companies obtained their water from Hampton; the Lambeth and Chelsea Companies, from Molesey; and the East London Company, from Sunbury. The last-mentioned Company did not obtain all their water from the Thames. The quantity taken daily by the Companies was as follows: West Middlesex, 29¼ million gallons; Southwark and Vauxhall, 25½ million gallons; Grand Junction, 17⅞ million gallons; Lambeth, 20 million gallons; Chelsea, 9½ million gallons; East London, 4¼ million gallons. With the exception of the Southwark and Vauxhall, all the Companies had taken a much smaller quantity of water from the Thames than they were entitled to draw. The total quantity authorized was 130 million gallons; whereas in August last year the total taken by all the Companies was 93 million gallons. Only a very small portion of the navigable part of the river was, or could be, affected by anything the Companies might do. The quantity of water taken from the Thames might be increased threefold without practically affecting the navigable part of the stream. Speaking generally, the Companies took about one-twelfth of the flow of the Thames. It was no doubt the fact that the water supplied to Glasgow was free from human pollution; and yet zymotic diseases were more prevalent in Glasgow than in London. There might be some reason for this which he did not understand; but, judging by results, the water supplied to London seemed to be purer than that sent into Glasgow. As to an alternative supply, witness said there were no figures or facts which would lead people to believe that by going to any other source for water the people would be better off.

Mr. *A. Dobbs*, recalled, said he appeared that day to give details to justify a statement made by him on the preceding occasion that the Metropolitan Water Companies could, if they chose, stop the trade of London. What he meant was that they could speedily handicap the trade of London, if they desired, by practically doubling the rates they were now levying in a great portion of the City. Witness then proceeded to explain that the Companies at the present time levied the maximum 3 per cent. in all cases; but in that of the larger houses they only levied the 3 per cent. upon half the rateable value, whilst in the cases of the smaller houses they levied on the full value. The Companies could, he said, at any time double their rates on the larger houses; but they thought it wise, in the exercise of their discretion, not to do so.

This concluded the business of the day.

On the re-assembling of the Committee last Tuesday,

Sir *J. B. Monckton* was re-called. He produced some further communications from the Secretaries of several of the Water Companies in reference to invitations sent them by the Corporation to attend the inquiry by official representatives, and give evidence before the Committee. One of the letters was from Mr. A. Jelly, the Secretary of the Southwark and Vauxhall Company, stating that as the Committee was a wholly irresponsible body, and apparently formed for supporting the erroneous views held against the Water Companies, the Company did not deem it expedient to take any part in their proceedings. The Company, it was added, would be prepared at any time to give full and satisfactory explanations before any responsible tribunal, should it be deemed necessary to make efficient inquiry into the water supply of the Metropolis. The second letter was from Mr. A. Dickson, the Secretary of the Kent Company, stating that his Directors did not propose to avail themselves of the suggestion of the Committee that they should tender evidence at the inquiry. The third letter was from Mr. I. A. Crookenden, the Secretary of the East London Company, stating that, with every wish to show courtesy to the Corporation, the Directors felt that they could not accept the invitation. The Company, it was added, had faithfully carried out the obligations imposed upon them by Parliament, and were prepared to prove it by attending and giving evidence before any Parliamentary Committee which might be appointed to inquire into the charges and supply of the Companies. The last letter was from Mr. S. H. Louttit, the Secretary of the Lambeth Water Company. In this letter it was stated that, as the water supply of London had so frequently been the subject of inquiry by Committees appointed by, and responsible to Parliament, and as exhaustive reports had been published, and as, moreover, elaborate official reports were presented annually to Parliament on the London Water Supply, there did not seem to the Directors to be any need for further inquiry into the subject; and therefore they considered that no advantage would be gained by sending a representative of the Company to offer evidence before the Committee, which was composed of members of the Corporation, which, with all respect, the Directors submitted was in no way a judicial tribunal. Witness added that he had received an acknowledgment only from the New River Company, which was the only one of the Companies that had not replied.

Sir *R. Rawlinson*, K.C.B., was the next witness. He said he was formerly Chief Engineer to the Local Government Board, and Chairman of the Royal Commission appointed to inquire into the pollution of rivers. He had had considerable experience in the supply of water, both in England and abroad, and had paid special attention to the water supply of London. The question as to the advantage to be derived from a soft or a hard water supply was a very complicated one. The water obtained from the highlands of Scotland was very soft, and was very deleterious to the health of any but the inhabitants of the district, although it did not disagree with them. The result of an abstract made of a certain number of populations supplied by soft and hard water was in favour of hard water. He did not believe that Thames water was necessarily injurious to health. He knew populations that were supplied with water very much more polluted than the water of the Thames; and during cholera periods no signs of the disease appeared there. He knew also that cholera had shown itself among populations supplied with apparently very much purer water. Though there might be something that was deleterious in the water, there were surrounding conditions in which individuals lived, which also had to be taken into consideration as factors in the promotion of zymotic diseases. Birmingham was supplied from a river which was polluted with an inflow of sewage; and when cholera appeared in England not a single case originated in that town. London was the place most largely supplied from rivers and wells. Calcutta was supplied from the Ganges, Glasgow from a lake, and Manchester and Liverpool from reservoirs; but the mortality in London stood at a very much higher rate than any of the places mentioned, although it was served from the open River Thames and from the Lea. He thought it was possible to vastly improve the water supply from the Thames. It might be taken from the area of the Thames basin without the water going into the open river. The basin of the Thames had an area of 5162 square miles; and the Lea one-tenth of this. The water supply of London would, he thought, be enormously improved if Dr. Clark's process were adopted. The water of the Thames contained 16 grains of bicarbonate of lime per gallon, which meant a ton in each million gallons. By Clark's process the 16 grains could be brought down to about 4 grains. He thought the water of the Thames should be intercepted before it reached the river; and its hardness should be reduced by the process he had mentioned, which took out all animal and vegetable matter. He was of opinion that a soft water supply for London, with the present mode of distribution, would result in a much higher death-rate. He had considered the advisability of obtaining lake water for London; but he did not think any benefit would arise by obtaining water from North Wales. The obstacles to such a step would be almost insuperable, although it was possible no doubt North Wales could furnish a sufficient supply for London. He considered that the water supplied to a population should be in the hands of a municipality or the governing body, so that it might be used for the benefit of the community. It should not be dealt in and sold as one sold groceries. At the present time water could only be obtained from the Companies for purposes outside the domestic supply by buying it at a certain rate per gallon. If the water supply were in the hands of the governing body, the price would be the fraction of a farthing per 1000 gallons, or merely the cost of the pumping power. He therefore thought that if the water supply of the Metropolis were in the hands of a municipal body, a better supply could be obtained at a cheaper rate. He considered that the London County Council were the proper body to have the control of the water supply, although he should not object to a Special Commission. He did not, however, believe that an unweildy body like the County Council could do much good; it was too big. The mode of payment and distribution would be a matter for after consideration. The present system of water rating he considered very unfair. A meter system would obviate many of the existing evils; but the Water Companies would very soon begin to cry out if meters were put into West-end houses. His idea was to so manage the volume of water for London either by wells or by taking it from the gravel beds or the spring heads, as to receive the water into the conduits without its going into the river at all. He was clearly against the supply of water being in private hands, although he had no charge to bring against the Companies, who had, on the whole, done good work. With reference to bringing a supply of soft water from a distance, independently of the financial troubles it would involve, there would be caused a great amount of inconvenience in rectifying fittings. He did not believe that the quality of the Kent water—so much vaunted because it came direct from the chalk—was very superior to that of the other London Water Companies. He was of opinion that the quality of the Thames water was exceedingly good, although it might be improved if it were carried by gravitation and then distributed. Houseboats, he thought, should not be allowed on rivers from which water was taken for drinking purposes.

Major-General *Scott*, R.E., the Official Water Examiner under the Metropolis Water Act, 1871, was the next witness. He put in a statement showing that the populations supplied by the various Companies were as follows: East London, 1,255,142; New River, 1,150,000; Southwark and Vauxhall, 833,943; Lambeth, 637,340; West Middlesex, 544,315; Grand Junction, 503,830; Kent, 439,380; Chelsea, 277,450. He said that the local authorities having jurisdiction within the limits of the Thames basin, and above the intakes, were 14 county councils 47 urban and 85 rural sanitary authorities. The supply was obtained from the Thames, and from certain springs and wells, the proportion being—Thames, 50·95; Lea, 34·87; springs and wells, 13·97; ponds at Highgate and Hampstead, 0·21. Last year the quantity of water supplied from the Thames was 14,161,350 cubic metres; from the Lea, 96,550,365 cubic metres; from springs and wells, 38,671,073 cubic metres; and from ponds at Hampstead and Highgate (for non-domestic purposes only), 569,164 cubic metres. The proportion supplied from wells of recent years had not varied much, although it might be very considerably increased. The supply derived from this source was, he thought, superior in quality to the water from the Thames. The average daily quantity drawn from the Thames in 1889 was 85,060,380 gallons; from the Lea, 58,220,184 gallons; from springs and wells, 23,380,782 gallons; from ponds at Hampstead and Highgate, 343,207 gallons. The total daily supply was therefore 166,942,482 gallons, which represented, for a population averaging 5,581,491, a daily consumption of 29·91 gallons per head, and 222 gallons per house for all purposes.

Captain *Shaw*, K.C.B., Chief Officer of the Metropolitan Fire Brigade, was then asked to give evidence bearing upon the water supply in relation to fires. He said that, as a general rule, the number of hydrants provided for the use of the Fire Brigade was adequate,

There was no difficulty in obtaining the supply of water that existed, but the quantities depended upon the size of the pipes and the pressure. The pressures over and under varied considerably. In the case of the Southwark and Vauxhall Company, the pressure varied from 12 to 78 lbs. to the square inch; in the district covered by the Lambeth Company, it varied from 80 to 140 lbs.; in the West Middlesex, from 10 to 59 lbs.; in the Grand Junction, from 17 to 50 lbs.; in the New River, from 28 to 87 lbs.; in the East London, from 18 to 38 lbs.; and in the Kent, from 22 to 75 lbs. He had found the fire hydrants put down by the Corporation in the City of the greatest possible value to the brigade. The Corporation had provided 822 of these hydrants; and the other parts of the Metropolis were not nearly so well supplied. Last year 20 million gallons of water were used for extinguishing fires—a little more than half being obtained from the rivers, canals, and docks, and the remainder from the pipes. During the year there were nine cases of short supply; nine of late attendances of turncocks, and in ten cases no attendances of turncocks at all. All that he required was a constant supply, an adequate pressure, and a sufficient number of hydrants.

This concluded the business of the day, and the Committee adjourned *sine die*.

The PRESIDENT announced that the Committee would hold their next meeting in Manchester, and from there proceed to Glasgow. After concluding their inquiries in these cities, they would return to London, and hold their final meeting.

Proposed Extension of the Blackburn Gas-Works.—At the monthly meeting of the Blackburn Town Council last Thursday, the recommendation of the Finance Committee for the borrowing of £30,000 for gas purposes was approved. The money will be raised on debentures bearing interest not exceeding 3 per cent. It is proposed to extend the present plant so as to increase the output to meet the growing requirements of the borough.

Proposed Extension at the Burnley Gas-Works.—The members of the Gas Committee of the Burnley Corporation visited London last Thursday to inspect the Coze system of inclined retorts in operation at Southall. If the Committee are favourably impressed with the system, it will be adopted at Burnley; a scheme being on foot for a considerable enlargement of the gas-works. At the last meeting of the Town Council, a long discussion took place with regard to the necessity of the members of the Committee going to London at all. Replying to the objectors, Alderman Collinge, Chairman of the Committee, said they were proposing to adopt an entirely new system involving a very large expenditure, and if it turned out a failure it was only right that the whole Committee should join in the responsibility. He very much deprecated the cheeseparing policy adopted by some members of the Council. Alderman Lancaster reminded those who objected to the deputation that the new system involved an expenditure of £30,000; and it was highly necessary that the Committee should inspect the system before committed themselves. The minutes were approved.

The Northern Coal Trade.—The course of the northern coal trade has been affected by the railway strike in South Wales, which has driven many steamers for cargoes to this district, and considerably increased the demand for steam coal. Most of the coal-owners had a fair amount of orders in hand; and thus they have not been able to take full advantage of the determination of trade from Wales. Steam coal has been most affected, and where early delivery of coal could be guaranteed, higher prices prevail. For best Northumbrian steam coal, as high as 15s. per ton is asked—the highest figure for a long period; but this is not known to have been yet paid. Still, should the strike continue, higher prices are to be expected. Small coal is rather dearer. Gas coal is firm, but little affected by the strike. It is believed that there have been sales for large London contracts at from 11s. to 12s. per ton. The latter is the price generally current, though one or two of the chief firms ask rather more. Bunker coal is dearer, as more of the supply is drawn from the northern district, and the price varies from 10s. to 14s. per ton free on board. There is a very small inquiry for house coals, and the price is very dull just now. Manufacturing coal is steady, with a fair demand; but the iron-works seem to be taking less. Coke is only in limited request, and the price for best blast-furnace coke is from 18s. to 18s. 6d. free on board. Gas coke is unaltered.

Maidstone Gas Company.—The annual general meeting of this Company was held last Thursday, when the Directors reported that the net profits for the year ending June 30 last amounted to £7632, out of which they recommended the declaration of a dividend, less income-tax, at the rate of 10¾ per cent. per annum, of which 5¾ per cent. will be payable on the 1st prox. The business of the Company continues to increase; and the works, under Mr. H. Smythe's management, are in all departments in good order. The Chairman (Mr. A. Warde) in moving the adoption of the report, alluded to the improved business of the Company; and then called attention to the fact that a new coal-store had been built during the year by which the capital account had been increased by £2735. The renewal fund had been made up to £3000; and seeing that the price of coal had increased as it had done, he thought it showed prudence on the part of the Directors that they should have kept this sum for repairs during the current year. Having done so, it was evident that the revenue account would be charged with very little for wear and tear next year; and therefore he hoped they would be able to maintain the rate of dividend and the price of gas to the consumers. The quantity of gas made per ton of coal in the past year was 11,122 cubic feet, of which 10,650 cubic feet were sold. They expected a considerable increase in coke and other things. He might mention that the Company had engaged a first-class cook to give lectures on cookery, and to show the advantages of gas over coal in summer time for the purpose. This had had a very good effect; they had sold a considerable number of stoves, and there would no doubt be a great increase during the year. They had also established a benefit club for their men; and it was working very satisfactorily. They had paid a considerable amount out for sickness, and had a balance in hand of £30. The report was adopted; and the dividend recommended was declared.

NOTES FROM SCOTLAND.

From our Edinburgh Correspondent.

EDINBURGH, *Saturday*.

An attempt was made by the Bathgate Police Commissioners this week to get the consent of that body to the adoption of the Burgh Gas Supply (Scotland) Act, 1876; but it did not succeed. The following narrative of the proceedings shows the rather bombastic nature of the arguments which are employed on such occasions by advocates of transfers: Mr. Mackill characterized his motion (for the adoption of the Act) as the most popular one that had ever been made at that table. When he gave notice of it a month ago, the Gas Company had raised the price of gas 10d. per 1000 feet; but since the matter had been talked about, the price had fallen 5d. The Commissioners had gone in for drainage, water supply, and paving schemes, which meant a continual drain on the ratepayers' pockets. This proposal of his, he was convinced, would never cost the ratepayers a penny, but instead be of great benefit to them. Commissioner Stewart moved that the Act be not adopted, as the Commissioners had too many irons in the fire already. Ex-Bailie Dougal seconded the amendment, remarking that with the congested state of business the Commission would soon be as bad as the House of Commons. The general opinion of the meeting was that it was not expedient to take up this matter at present, and Mr. Mackill withdrew his motion.

In Oldmeldrum, a small town in Aberdeenshire, the price of gas is to be maintained at 10s. 5d. per 1000 cubic feet. It is no wonder at such a price, the Directors' report, submitted last week to the shareholders, should have recorded a falling off in the revenue.

The Bridge of Allan Police Commissioners last Tuesday considered a communication from the local Gas Company, intimating that the charge for lighting the public lamps during the ensuing season would be £115, including ten all-night lamps. The increase in the charge was rendered necessary through the rise in the price of gas-making material, and it was intended to raise the price of gas to the general public. It was agreed to accept the Company's offer.

In the report which has been issued by the Board of Trade with reference to the proceedings under the Electric Lighting Acts during the past year, it is stated that in Aberdeen, in addition to the application by the Scottish House-to-House Company for a Provisional Order, the Local Authority also applied, and that preference was given to the Local Authority, and the House-to-House application was not proceeded with. As regards the Town Council application, a Bill to amend the Electric Lighting Acts is now before Parliament, and if it become law in sufficient time to justify the Board of Trade in granting the Order, it will be granted to the Town Council. As for the application for a Dundee Electric Lighting Order by the Gas Commissioners and Police Commissioners, a Bill to amend the Electric Lighting Acts is now before Parliament, and if it becomes law this Order will also be granted. The Scottish House-to-House Company also lodged an application, but preference was given by the Board of Trade to the application of the Commissioners, and the House-to-House application was not proceeded with.

The Dundee Water Commissioners, in recognition of the eminent service which Mr. J. Watson, M. Inst. C.E., their Engineer, has rendered to them, and in respect of the additional work which will be thrown upon him in connection with the proposed new works, have granted him an honorarium of 250 guineas, and advanced his salary by £100 per annum. Mr. Watson was appointed Engineer and Manager to the Water Commissioners in December, 1871, at a salary of £250. Since August, 1874, he has discharged the duties of engineer of all new works executed by the Commissioners, including parliamentary and executive plans, and the superintendence of all such works. In June, 1875, his salary was increased to £450; and eight years later to £500. On March 1, 1888, in respect of his engineering services to the works then progressing, he was voted a sum of £500, payable, one half at Whitsunday, 1888, and the other half on the completion of the works. The transfer of the water-works from the Water Company to the Commissioners took place in 1869. Dundee has grown immensely since then. In 1869 the daily consumption of water was 2 million gallons, whereas to-day the supply is 10 millions daily. At the meeting last Thursday, Mr. Toggie objected to the increase, because, although the Water Engineers in Edinburgh and Glasgow had larger salaries than Mr. Watson, in those places the domestic water-rate was much lower than in Dundee; and until this rate was reduced from the figure at which it now stood, the Commission should not increase salaries. The recommendation of the Committee that the honorarium and increase be granted was agreed to by 22 votes to 4. The vote shows the mind of the Commission towards Mr. Watson, who is one of the most capable public officials in Scotland.

From our Glasgow Correspondent.

GLASGOW, *Saturday*.

At last Wednesday's meeting of the Town Council of Glasgow, the Gas Committee's minutes and annual report of the Corporation gas supply undertaking were up for consideration and approval, which was moved by Mr. Ure, who is practically the Convener of the Committee. In seconding the adoption of the minutes and report, Mr. M'Laren, Convener of the Finance Sub-Committee, made an interesting statement. In the course of his remarks, he observed that the capital expenditure on their works, pipes, and meters during the year was £605,249. There had been added to this £84,602, and this had been met out of the revenue. Their capital at present stood at £637,132. The principal item in the expenditure was the sum of £57,437—the cost of altering the Tradeston works, owing to the increased demand for a gas supply on the South Side. In this connection, it might be noted that the highest capital expenditure under the Corporation since they acquired the works 21 years ago was £1,440,081. Within the last thirteen years they had been greatly reducing their capital expenditure, until it now stood at £637,132. He made a calculation, and found that if they took the amount of gas sold and their capital it left £2 1s. 4d. per ton of coal carbonized, which showed that they compared favourably with any other Gas Trust in the kingdom. If they looked at the revenue, they found things equally satisfactory.

Last year, when they reduced the price of gas 2d. per 1000 feet, they calculated that they would lose about £20,000. But the operation had resulted in a deficit of only £3000, and this was due to the greater consumption of gas. On the whole, there was a net increase in revenue of £22,692, and they had been able to carry forward to next year's account £3245; and they proposed to keep the gas at the same price as last year—viz., 2s. 6d. per 1000 feet. The motion was unanimously agreed to.

At a late meeting of the Glasgow Corporation Gas Committee there was submitted a letter from Mr. Henry Cowan, Chairman of the Partick, Hillhead, and Maryhill Gas Company, stating that, as the Company understood that negotiations were being opened by the Town Council with Hillhead and other outside burghs with a view to annexation, the Directors would be glad if the Gas Committee would appoint a Sub-Committee to meet with a Sub-Committee of their number at an early date, so that, if possible, some mutual and amicable arrangement might be come to between the Corporation and the Company. In accordance with the request of Mr. Cowan, the Gas Committee appointed the Lord Provost, Bailies Stevenson and Paton, and Councillors Ure, M'Laren, and Simons, as a Special Sub-Committee to meet with representatives of the Company, and to report. Mr. Gray said he supposed that the Council would not be committed to anything by entering into negotiations for the purchase of the Company's works. It should be carefully kept in view that they were holding over their decision about the Botanic Gardens question until the Hillhead people and the other authorities had made up their minds what they were going to do. Mr. Ure replied that the Committee had courteously appointed a Special Sub-Committee to meet the Directors and to report. The Gas Committee would not take any hurried action in the matter, but would report and keep themselves in touch with the Town Council.

As Dumfries was one of the earliest towns in Scotland (if not, indeed, the very first of them) to adopt the Burghs Gas Supply (Scotland) Act, 1876, there is always some interest attaching to the records of its Corporation gas undertaking from year to year. Hitherto its history has been one of continuous progress; and the report for the past year is "another of the same." At the recent annual meeting of the Gas Commissioners, the report for the year ending May 15, 1890, was submitted by Mr. G. Malam, the Engineer and Manager. This was the twelfth year of the management of the burgh gas supply by the municipal authorities. Mr. Malam stated that the quantity of coal carbonized during the year was 5243 tons, the average cost of which was 13s. 11d. per ton, as compared with 5015 tons in the preceding year, at an average cost of 15s. 11·23d. The quantity of gas manufactured was 53,592,700 cubic feet; the average yield being 10,221 cubic feet, as against 52,606,100 cubic feet, with an average yield of 10,489 cubic feet per ton in the preceding year. Including what was used in the works, the quantity of gas sold was 47,392,400 cubic feet, or an average of 9039 cubic feet per ton of coal carbonized, as compared with 46,465,825 cubic feet, or an average of 9264 cubic feet per ton of coal carbonized, in the year 1888-9. The unaccounted-for gas amounted to 11·56 per cent., or rather less than that of the preceding year. The erection of the improved retort-bench, at an estimated cost of £1302, is progressing; and when it is complete and in working order, Mr. Malam anticipates that it will repay the outlay in a few years by the greater economy of fuel and the increased durability of the plant as compared with the ordinary method of carbonizing. Mr. Malam's estimate for the current year, after making allowance for the interest on mortgages, sinking and reserve funds, shows that there will be a probable balance of £151 9s. on May 15, 1891, even after allowing £250 for the cost of the new retort-bench. In his estimate of the revenue account, Mr. Malam sets down the amount of coal to be used at 4500 tons, at an average cost of 16s. 6d. per ton; and the total expenditure at £7815 7s. He also looks forward to a sale of 43,236,800 cubic feet of gas per meter, and 3,483,200 cubic feet for public lighting—in all, 46,720,000 cubic feet, at 3s. 6d. per 1000 cubic feet, and realizing £8176. His residual products are calculated to fetch £1642 12s. 11d. (tar and ammoniacal liquor, £897 12s. 11d.); and as rents for gas cookers on hire he looks for £58. There is thus a total estimated revenue of £9876 12s. 11d.; and the prospective balance to be carried to the profit and loss account is consequently £2061 5s. 11d., out of which the net profit of £151 9s. above mentioned is looked forward to. The statement of accounts for the year 1889-90 which was submitted to the Gas Commissioners was carefully compiled, and everything in it that one would like to know about was clearly put. The expenditure on capital account up to May 15, 1889, was £33,000, for which mortgages exist; and the bank account was overdrawn to the extent of £838 16s. 2d., to meet extra outlays incurred during the past year. The revenue account showed the total income to have been £9411 13s. 8d.; and the expenditure, £6898 7s. 4d.—leaving a balance of £2513 6s. 4d. to be carried to the profit and loss account, which stood at £568 at the close of the financial year. At the meeting of the Commissioners, the adoption of the report and accounts was moved by Mr. Currie, who referred to the new retort-bench, and explained that £500 of the expense would be charged against revenue, as being in lieu of the cost of renewing the old bench—the charge being spread over two years. Taking into account the prosperous year of the Gas Commission, the Gas Committee were certain they would be able in this time to wipe off the overdraft at the bank caused by the new bench. Looking to the increased price of coal, they must consider themselves fortunate in not being obliged to raise the price of gas, and yet being able to meet all their large outlays. He concluded by formally moving that the charge for gas for the current year be fixed at 3s. 6d. per 1000 cubic feet, with the usual deductions to large consumers. Bailie Dykes seconded the motion, and it was agreed to.

There has been quite a "boom" on in the Glasgow market this week, in respect of gas coals, and it does not seem likely to moderate until the various gas companies and corporations that have delayed making their purchases have secured their supplies of coal for the forthcoming lighting season. Rich and even ordinarily good cannels cannot be had for the buying, as the coal-masters and merchants are so completely sold forward as to have none at their disposal. Stocks are practically *nil*. Coals of second and third qualities may still be booked, but only at an advance on the prices which were ruling two or three weeks since. Splint coals which are suitable for gas making, such as are now extensively used at the Glasgow Gas-Works, are actually up 6d. per ton, and holders will only book orders for the season at an advance of 1s. per ton; indeed, such coals as were sold to the Glasgow Corporation Gas Committee at from 9s. 2d. to 9s. 5d. per ton, have been bought during the past week at over 10s. per ton by one manager, and the same gentleman has found it prudent to place orders for shale and cannel coal at rather more than 13s. per ton—being an advance of 4s. 6d. per ton in each case since this time twelvemonth. I am told that those companies and corporations that have still to buy will be bitten worse this year than they were last. It is stated, on the authority of a member of the Glasgow Corporation Gas Committee, that they will yet require to purchase 150,000 tons additional to what they concluded contracts for a few weeks ago, and that they will probably be in the market again by the end of this month or early in September. The knowledge of this fact will doubtless influence coal-masters and merchants in most cases to put on the very highest price that it will be possible to get. I am told that at least a dozen companies and corporations have made their purchases within the past week or ten days, and that in the ensuing week eight others will do their best to decide on the offers that have been sent in to them. There are very heavy shipments of cannels both to the Continent and to South America. The rich cannel is almost all being sent abroad. Cargoes of 500, 1000, 1500, and 2000 tons have been reported this week—all rich or first-class cannel, and all going to the Continent. The cannels to which I refer are such as range from about 29s. to 38s. 6d. per ton, f.o.b. either in the Clyde or at Leith. Small lots—100 tons or so—of the high-priced coals can only be had at 40s. per ton. It is said that the owners of a colliery in South Lanarkshire which yields a high-class cannel, have so far sold their produce for the season that they are now in the market themselves buying to supply immediate wants. Owing, it is alleged, to the fact of such low prices prevailing some 15 months ago, or thereabouts, for cannels of second and third qualities, a new market had to be opened for them, which was found in South America and the Continent of Europe; and it is further said that if such an opening had not been found, the coals in question would have been sold largely to the Scotch steel companies for the production of gaseous fuel. Such coals would have been sold as "whole-seam." A cargo of 3500 tons of a second-class gas coal is being shipped this week from the Clyde for South America. That there has been an unusually large demand this season may be inferred from the fact that the contracts closed by one Glasgow firm up to the present amount to about 30,000 or 35,000 tons more than had been fixed at the same time last year.

There has been during the past week something approaching a strike on the part of the stokers and other workmen employed by the Partick, Hillhead, and Maryhill Gas Company, on the question of signing an engagement. In the meantime, however, the proposal of the Manager has been withdrawn, and the men are working away quietly.

It is with very great regret that I have to mention the death of Dr Henry Muirhead, who was long associated with the Cambuslang Gas Company, as the Chairman and otherwise. The deceased, who was about seventy-four years of age, had for many years been retired from medical practice, and lived a quiet life, doing much good amongst the suburban community in which he dwelt for a couple of decades. He was many years a member of the Philosophical Society of Glasgow, which he long served in various capacities, including that of President for three years.

During the past week the Glasgow pig iron market has been strong, and a large amount of business has been done in warrants; the buying in a great measure being to close over-sold accounts. It is said that from 60,000 to 80,000 tons were bought on Tuesday and Wednesday to cover previous "bear" sales. Up to 47s. 10d. per ton cash was attained yesterday as the price for Scotch warrants—the highest price touched during the past five months. Prices in the local coal trade have hardened all round this week, partly on account of the labour troubles that have been ruling in South Wales.

The following is a report of the local sulphate of ammonia market for the past week: The ammonia market during the week has been dullish, and little business has been passing. A few orders for Glasgow shipment have helped to firm things a little; and equal to £11 10s. usual terms f.o.s. Glasgow was refused by one maker. For Leith £11 7s. 6d. is asked, with a shade under that figure offered, but sellers are not inclined to accept less. For forward, no business of importance has taken place.

The Spiral System of Guiding Gasholders.—The Birmingham Oxygen Company, Limited, have accepted the tender of Messrs. R. and J. Dempster, of Manchester, for a telescopic gasholder and wrought-iron tank on Messrs. Gadd and Mason's spiral guide principle.

The Lancashire Coal Trade.—The holidays have somewhat interfered with business, but it is evident the upward tendency in prices announced last week has not become general at all. In fact, the firms which have marked an advance of 5d. per ton because of the further concession to the colliers are not many, and the advance is therefore not likely to be maintained. There has been a fair inquiry for most descriptions of coal; but, in consequence of the uncertainty of many firms regarding the matter referred to above, prices are somewhat irregular. A number of corporations completed contracts during the past week for the coal supply to their respective gas-works; and in these cases also prices vary considerably. The Bolton Corporation have signed contracts for the supply of 50,000 tons, at 11s. 1¼d.; the Chorley Corporation, for a much smaller quantity, at 11s. 6d.; and Burnley at 15s. for cannel nuts—an advance of 1s. 6d. upon the price paid last year at this time. For the general trade there has been a fair inquiry all round, save for descriptions common to iron-making purposes. Best house coals are quoted at 11s. 6d. to 12s. per ton at the pits; seconds, 10s. to 10s. 6d.; and common round, 8s. 6d. to 9s. Burgy, 7s. 6d. to 8s. for the better qualities; and 5s. 6d. to 6s. 9d. for inferior descriptions. Slack hangs on the market at about 7s. 3d. for best descriptions. Good ordinary steam coal for shipment sells freely, and is obtainable at from 10s. to 10s. 3d. per ton delivered at Liverpool.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Aug.* 9.

Sulphate of Ammonia.—The firmness of the market continues, and spot parcels are getting very scarce. Both here and at Hull there is so little available that even a moderate demand could not be satisfied without difficulty; and there is no saying what the consequences might be if this demand was developed. Fair quantities are still obtainable at Scotch ports; but these are not quite so suitable for American and Spanish shipments. There have been a few German and French inquiries; but the limits have been too low to admit of business resulting. Nitrate continues firm, without change in values.

LONDON, *Aug.* 9.

Sulphate of Ammonia.—This article is distinctly firmer; and the autumn demand being near at hand, a large business may be expected at improving rates. The present price, at which a fair quantity has been sold during the week, may be taken at £11 12s. 6d. per ton.

Tar Products.—Benzols have again advanced, and 4s. can now be had for 90 per cent., and 2s. 11d. for 50-90. There has been a good inquiry recently for both creosote and pitch, and in both these articles important transactions are likely to occur soon. Anthracene is decidedly better; large sales being reported of both "A" and "B" qualities at 1s. 4d. and 1s. respectively. Carbolic acid is unchanged at 2s. for 60°.

Continental Union Gas Company, Limited.—An extraordinary general meeting of this Company is to be held to-day to consider certain resolutions altering the Articles of Association by the addition of clauses to provide for the reduction of the capital by paying off or returning the portion not needed, by writing off capital, by reducing the liability on the shares, or in any other way; and to enable the Company to convert paid-up shares into stock carrying all the privileges of the shares.

The Capital of the Gravesend Gas Company.—The Directors of the Gravesend Gas Company having advertised to sell by auction 150 shares, of £20 each, in the capital of the Company authorized by the Gravesend Gas Act of the present year, the Town Council instructed their Clerk to make inquiries thereon. He has reported that the Company have resolved to convert £9000 of the sum borrowed under the former Act, of 1863, into capital, and to distribute it among the proprietors without offering the shares to the public at all; the right to do so being claimed under the Companies' Clauses Act, 1845, notwithstanding the provisions of the Special Act of 1890. The Company are, we believe, pursuing this course under the advice of Counsel; and the Town Clerk states that he is not prepared to recommend the Corporation to interfere in the matter, as their right to do so appears very doubtful. The Corporation have adopted the report, and the matter has therefore ended so far as they are concerned.

Exhibition of Gas Appliances at Brixton.—A four days' exhibition of gas appliances, with cookery lectures by Miss H. M. Young, of Warrington, concluded last Friday at the Brixton Hall. Both afternoon and evening, the meetings were well patronized. Altogether, there were some hundreds of exhibits; in fact, it may be said to be the largest exhibition that has been held in South London. Stoves and appliances were shown by Messrs. W. Sugg and Co., Limited; Messrs. T. Fletcher and Co.; Messrs. H. and C. Davis and Co.; and Messrs. J. Wright and Co. A new departure was made in giving stands to exhibitors whose appliances have not, as yet, been patronized by the gas companies—*i.e.*, let out on the ordinary hire system. The first of these were Mr. John Greenall, of Manchester, who demonstrated the capabilities of his patent steam washer for domestic laundry purposes, to the great surprise of the audience, many of whom would have hired a washer off-hand if one could have been so obtained. Another exhibit was that of Mr. G. J. Hutchings, of 47, Featherstone Street, E.C., who showed the "Yankee" steamer. By a small ring flame, an oven 10 in. by 12 in. was well heated, and the surplus heat conveyed to five steaming pots, which fitted one upon another. In the various receptacles could be placed fish, fowl, vegetables, &c., one not tasting of the other. After cooking, the boiling water could be utilized for washing-up purposes, it being quite clear. Altogether, the Brixton gas exhibition and Miss Young's lectures have been a great success.

New Joint-Stock Companies.—The following joint-stock undertakings have lately been registered: The *British Gaslight Improvement Company, Limited*, with a capital of £160,000, in 6000 preference shares of £5, and 130,000 ordinary shares of £1 each, to carry on the business of a gas company in all its branches, as well as that of manufacturers of all kinds of lamps. The Directors named in the Articles of Association are: Messrs. J. Boustead, H. Wollaston Blake, Malcolm Guthrie, H. Lawrence Hammack, and H. Seymour King. The *New Safety Oil Lighting and Heating Appliances Company, Limited*, with a capital of £50,000, in £5 shares, to carry into effect an agreement made between the Patent Trust Corporation, Limited, and Frederick Bedborough Townend, on behalf of the Company, for the sale to the Company of certain patent rights, and to carry on the trade or business of manufacturers of and dealers in lighting, cooking, and heating apparatus, stoves, safety and other lamps, lamp oils, and lamp accessories of every description. *Samuel Gratrix, jun., and Brother, Limited*, with a capital of £150,000, in £10 shares, to acquire the works, plant, stock-in-trade, book debts, patent rights, and goodwill of the business carried on by Samuel Gratrix, jun., and Brother, of the Alport Lead Mills, Deansgate, Manchester, and Phillip's Park Road, Bradford, Manchester, manufacturers of, and dealers in sheet lead, lead pipe, wrought-iron pipe, and fittings for steam, water, or gas purposes, &c. *Hall's Patent Gas Carburetter Company, Limited*, with a capital of £10,000, in £100 shares, to acquire certain letters patent, dated Jan. 9, 1889, for improvements in apparatus for carburetting gas in accordance with an agreement made on May 7, 1890, between J. D. Hall and W. J. Davis, both of Liverpool. The *Circulus Gas Cupola Company, Limited*, with a capital of £1650, in £1 shares, to exploit and work inventions as patentees, proprietors, or licensees.

The Lincoln Corporation and Electric Lighting.—At the meeting of the Lincoln Town Council last Tuesday, the Lighting, Building, and Improvement Committee reported the receipt of notices from the Electric Installation and Maintenance Company, Limited, and the Midland House-to-House Electricity Company, Limited, of their intention to apply to the Board of Trade for Provisional Orders to supply electricity in the city. The Committee resolved that the receipt of the notices should be acknowledged; and that the Companies should be informed that the Corporation would not consent to the construction of works for the supply of electricity by them in the city. Mr. Wyatt said with respect to the application of these Companies to set up electric lighting installations in Lincoln, the Committee thought, as the lighting of the city was in the hands of the Corporation, it would be a very unwise thing to allow any company to come in. Whenever electric lighting was introduced into the city, it ought to be done by the Corporation. He considered the Committee had acted wisely in refusing the applications.

Ascot District Gas Company.—The half-yearly meeting of this Company was held yesterday. The report submitted on behalf of the Directors by the Chairman (Mr. R. Berridge, Assoc. M. Inst. C.E.) showed that the profit for the past six months amounted to £538 8s. 10d., which added to the balance from the last accounts (£658 15s. 9d.), and after providing for every charge against the half-year's working, exhibited an amount to the credit of the profit and loss account of £1028 9s. 7d., out of which the Directors recommended a dividend at the rate of 2 per cent. per annum on the total capital of the Company, less income-tax. In moving the adoption of the report, the Chairman stated that the business of the Company was progressing satisfactorily. They obtained new consumers from time to time; and he was glad to say they did not lose many of the old ones. The works were in excellent order; and they were perfectly contented with the management. Like all other gas companies, they were suffering from the increased price of coal, which had somewhat diminished their anticipated profits. Mr. Alfred Williams seconded the motion, which was carried unanimously. The dividend recommended by the Directors was then declared, on the motion of the Chairman, seconded by Mr. Manwaring.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For Stock Market Intelligence, see ante, p. 346.)

Issue.	Share	When ex-Dividend.	Dividend or Div. Bonus.	NAME.	Paid per Share.	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d.
590,000	10	16 Apr.	10½	Alliance & Dublin 10 p. c.	10	17—18	..	5 16 8
100,000	10	,,	7½	Do. 7 p. c.	10	12¼—13½	..	5 11 1
300,000	100	1 July	5	Australian (Sydney) 5 % Deb.	100	107—109	..	4 11 9
100,000	20	30 May	8	Bahia, Limited	20	20—22	+1	7 5 5
200,000	5	15 May	7½	Bombay, Limited	5	7—7½	..	5 0 0
40,000	5	,,	7½	Do. New	4	5—5½	..	5 9 1
380,000	Stck.	27 Feb.	12½	Brentford Consolidated	100	218—223	..	5 9 10
125,000	,,	,,	9½	Do. New	100	160—165	..	5 12 2
220,000	20	13 Mar.	11	Brighton & Hove Original	20	40—42	..	5 4 9
320,000	20	28 Mar.	11½	British	20	43—45	..	5 0 0
50,000	10	13 Mar.	11	Bromley, Ordinary 10 p. c.	10	18—20	..	5 10 0
39,000	10	,,	8	Do. 7 p. c.	10	13—14	..	5 14 3
328,750	10	13 June	8	Buenos Ayres (New) Limited	10	12¼—13½	..	5 18 6
200,000	100	1 July	6	Do. 6 p. c. Deb.	100	103—106	..	5 13 2
150,000	20	27 Feb.	8	Cagliari, Limited	20	25—27	..	5 18 4
550,000	Stck.	16 Apr.	13½	Commercial, Old Stock	100	252—257	..	5 7 0
130,000	,,	,,	10½	Do. New do.	100	200—205	−3	5 4 10
130,000	,,	27 June	4½	Do. 4½ p. c. Deb. do.	100	117—122	..	3 13 9
557,320	20	13 June	13	Continental Union, Limited	20	47—49	..	5 6 2
242,680	20	,,	13	Do. New '69 & '72	14	33—35	..	5 4 0
200,000	20	,,	10	Do. 7 p. c. Pref.	20	38—40	..	5 0 0
75,000	Stck.	28 Mar.	10	Crystal Palace District	100	195—205	..	4 17 7
234,060	10	16 July	13	European, Limited	10	28—30†	..	4 6 8
120,000	10	,,	13	Do. New	5	19—20†	..	4 17 9
354,060	10	,,	13	Do. do.	5	13—14*	..	4 12 10
5,470,620	Stck.	13 Feb.	13†	Gaslight & Coke, A, Ordinary	100	240—245	..	5 6 1
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	100—103	..	3 17 8
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	255—260	..	3 16 11
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	121—125	..	4 0 0
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	180—185	..	4 1 1
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	100	164—169	..	4 2 9
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	255—260	..	3 16 11
1,061,150	,,	13 June	4	Do. 4 p. c. Deb. Stk.	100	115—120	..	3 6 8
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	123—128	..	3 10 4
650,000	,,	,,	6	Do. 6 p. c. do.	100	163—168	..	3 11 5
3,800,000	Stck.	15 May	12	Imperial Continental	100	216—220	..	5 9 1
75,000	5	13 June	6	Malta & Mediterranean, Ltd.	5	5—5½	..	5 9 1
560,000	100	1 Apr.	5	Met. of Melbourne, 5 p. c. Deb.	100	112—114	..	4 7 9
541,920	20	13 June	6½	Monte Video, Limited	20	19—20	..	6 10 0
158,000	5	30 May	10	Oriental, Limited	5	8½—9	..	5 11 1
60,000	5	28 Mar.	7	Ottoman, Limited	5	5½—6	..	5 16 8
166,870	10	16 July	4	Pará Limited	10	3½—4½	−½	8 17 9
420,000	100	2 May	6	People's Gas of Chicago— 1st Mtg. Bds.	100	98—102	..	5 17 8
500,000	100	2 Dec.	6	2nd Do.	100	95—100	..	6 0 0
150,000	10	16 Apr.	10	San Paulo, Limited	10	14—15	..	6 13 4
500,000	Stck.	27 Feb.	13½	South Metropolitan, A Stock	100	288—293	..	4 10 5
1,350,000	,,	,,	11½	Do. B do.	100	233—238	..	4 16 7
141,500	,,	,,	12	Do. C do.	100	247—252	..	4 15 3
650,000	,,	27 June	5	Do. 5 p. c. Deb. Stk.	100	140—145	..	3 9 0
60,000	5	27 Feb.	11½	Tottenham & Edm'nton, Orig.	5	11—13	..	4 8 5
						*Ex.div.		
				WATER COMPANIES.				
728,446	Stck.	13 June	9½	Chelsea, Ordinary	100	265—270	..	3 10 4
1,720,560	Stck.	16 Apr.	7½	East London, Ordinary	100	212—216	..	3 9 5
544,440	,,	27 June	4½	Do. 4½ p. c. Deb. Stk.	100	142—147	..	3 1 2
700,000	50	13 June	9	Grand Junction	50	121—125	..	3 12 0
708,000	Stck.	13 Feb.	10½	Kent	100	275—285	..	3 13 8
1,043,800	100	27 June	9½	Lambeth, 10 p. c. max.	100	250—255	..	3 14 6
406,200	100	,,	7½	Do. 7½ p. c. max.	100	197—202	..	3 14 3
200,000	Stck.	28 Mar.	4	Do. 4 p. c. Deb. Stk.	100	122—126	..	3 3 6
500,000	100	13 Feb.	12½	New River, New Shares	100	367—372	..	3 5 2
1,000,000	Stck.	31 July	4	Do. 4 p. c. Deb. Stk	100	125—128*	..	3 2 6
902,300	Stck.	13 June	6	S'thwk & V'xhall, 10 p. c. max.	100	170—174	..	3 9 0
126,500	100	,,	6	Do. 7½ p. c. do.	100	158—163	..	3 13 7
1,155,066	Stck	13 June	10	West Middlesex	100	265—270	..	3 14 1

† Next dividend will be at this rate.

Lighting by Water Gas at Harrogate.—The plant which the Mayor of Harrogate has laid down, at his own expense, for the supply of the main streets of the town with water gas, is now in operation, and Parliament Street is being lighted by the new illuminant. The lamps are placed at about the usual distance apart; and at a junction with another street there is a high-power lamp containing 24 jets.

Proposed Adoption of Electric Lighting at Ilkley.—A meeting of gentlemen resident at Ilkley, convened by circular, was held at the offices of the Ilkley Local Board last Friday week, for the purpose of considering a report of Messrs. Andrews and Preece as to the lighting of the town with the electric light, and to pass resolutions for the formation of a Company to carry out the scheme. Mr. Jabez Dobson, the Chairman of the Local Board, presided. In their report, the Engineers recommend the adoption of the low-tension system; the electric pressure not to exceed 120 volts throughout the whole service. Considering the probable requirements of Ilkley, the generating plant should be sufficient to maintain 2000 incandescent lamps of 16-candle power each. The length of the mains would be about 5000 yards, and they would cost about £5000, including the laying; while the distributing mains would be about nine miles in length, and would cost, including laying, about £3000. The generating plant would require to be in duplicate; and the cost of this, including engine-house, boiler-house, foundations, &c., would be £4000. The electric current would be supplied to the consumers by meter—the Company providing and fixing the main wires into the houses, and attaching them to the meter; and the cost for the number of lamps given would be a very profitable undertaking at 8d. per Board of Trade unit. It was decided to adjourn the meeting for a fortnight.

The Financial Results of the Liverpool Corporation Bill.—The Deputy Town Clerk of Liverpool (Mr. Harcourt E. Clare) has just presented to the Special Purposes Committee of the City Council, a report in regard to the proceedings before the Parliamentary Committee on the Corporation Bill, and the pecuniary and other results of the measure. After stating the effect of the clauses as they now stand, he points out that the pecuniary result of the Bill will be that by postponing the commencement of the sinking fund to repay the capital expended on the Vyrnwy Water-Works, a less sum by £12,200 per annum, for the next five years, will have to be raised from the water charges than would otherwise have been the case, assuming that the capital expenditure is taken at £2,000,000; and by equalizing the water charges, as between Liverpool and Bootle, a net additional sum of about £2500 a year will be paid by property in Bootle towards the water account, which sum will increase as the rateable value of Bootle increases. These two sums together will give a relief to the water charges in round figures of £15,000 a year for five years, and after that date a permanent relief of £2500 a year and upwards.

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS AND ENGINES.

Telegrams: "GWYNNEGRAM LONDON." TELEPHONE No. 2698.

GWYNNE & CO.,

HYDRAULIC AND GAS ENGINEERS,

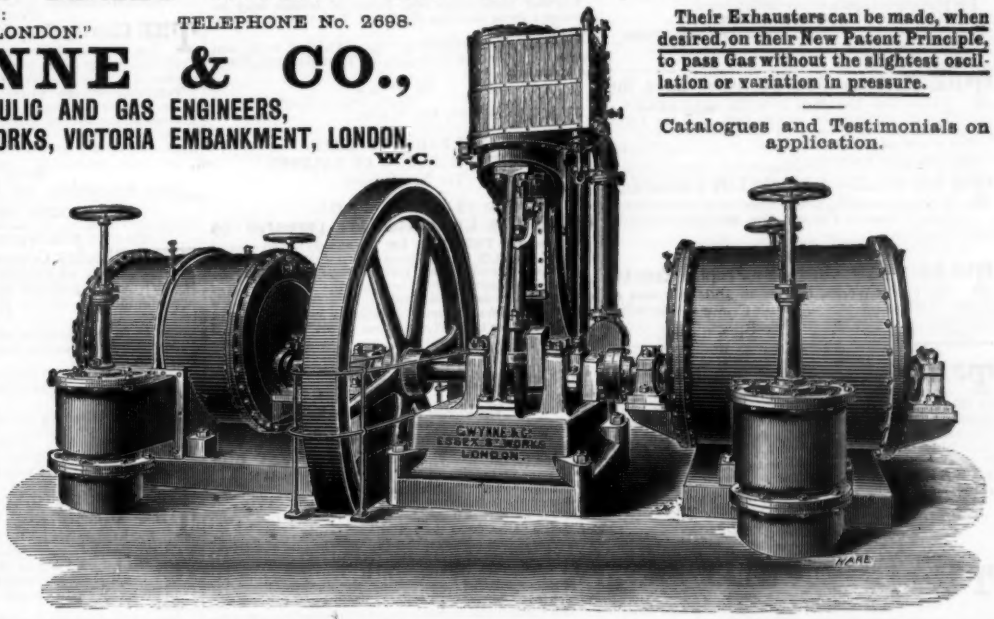
ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C.

Thirty-three Medals at all the Great International Exhibitions have been awarded to GWYNNE & Co. for Gas Exhausters, &c.

They have completed Exhausters to the extent of 29,000,000 cubic feet passed per hour, which are giving unqualified satisfaction in work.

Makers of GAS-VALVES, HYDRAULIC REGULATORS, VACUUM GOVERNORS, STEAM-PUMPS for Tar, Liquor, or Water; CENTRIFUGAL PUMPS and PUMPING ENGINES, specially adapted for Water-Works, raising Sewage, &c.

Also GIRARD and other TURBINES, HIGH-SPEED ENGINES, DYNAMOS, &c., &c., for ELECTRIC LIGHTING.



Their Exhausters can be made, when desired, on their New Patent Principle, to pass Gas without the slightest oscillation or variation in pressure.

Catalogues and Testimonials on application.

Exhausting Machinery at Fulham and Bromley Gas-Works—each set passing 400,000 cub. ft. per hour, drawing 14 miles distant from Beckton.

NOTICE TO ADVERTISERS.—COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office *not later* than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or Stoppages of PERMANENT ADVERTISEMENTS should be received not later than the FIRST POST on SATURDAYS.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.

Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

CANNEL COAL, ETC.

JOHN ROMANS & SON, EDINBURGH. Gas Engineers, supply all the most approved SCOTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.

Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, NEWTON GRANGE, NEAR DALKEITH, } SCOTLAND.

JOHN RILEY & SONS, Chemical Manufacturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitriol. References given to Gas Companies.

EXTRACT from the Harrogate Gas Company's Report, dated the 5th of February, 1890: Coal consumed, 8600 tons. Gas made, 92,880,000 feet; ditto sold, 84,880,000 feet; ditto unaccounted for, 8,000,000 feet; quantity made per ton, 10,800 feet; ditto sold, 9869 feet. Illuminating Power, 16·1 candles. Coals used, Brancepeth. Owners, Strakers and Love, Newcastle-on-Tyne; who have also Brandon Hutton Seam Unscreened Gas Coal. Analysis, 10,500 cubic feet per ton; Illuminating Power, 16·2 candles.

TO BE LET, on Lease or Yearly, a small GAS-WORKS in Lincolnshire, with a Coal Trade attached.

For particulars apply to R. LITTLE, Lessee of Gas-Works, Burgh, LINCOLNSHIRE.

JAMES LAWRIE & CO. supply Best SCOTCH CANNEL COALS, Best FIRE-CLAY RETORTS, BRICKS, TILES, and LUMPS; BOILER SEATING BLOCKS, FLUE COVERS, and SILICA BRICKS for SPECIAL FURNACE WORK; COKE BARROWS, BOGIES, and SMALL WAGONS.

Postal Address: 1, WHITTINGTON AVENUE, E.C.

Telegram Address: "EIRWAL LONDON."

W. C. HOLMES & Co., Huddersfield, AND 80, CANNON STREET, LONDON, Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.

*** See Advertisement p. 280 of last week's issue.

Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

J. & J. BRADDOCK, Globe Meter Works, Oldham.

First-Class Award, Melbourne Exhibition, 1889, for Wet and Dry Gas-Meters, Station Meters, and Governors, Pressure-Gauges, Street Lamps, and Pillars, &c.

Telegraphic Address: "Braddock, Oldham."

SULPHURIC ACID delivered in Manufacturers' Tanks or Carboys.

Prices on application to HARDMAN and Co., Miles Platting, MANCHESTER.

WANTED to Lease, a Gas-Works of any magnitude.

Address No. 1849, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

TO ENGINEERS AND MANAGERS.

PLANS, Specifications, &c., of Extensions made by Draughtsman, privately.

Address E. M., 396, Messrs. Deacon and Co., LEADENHALL STREET, E.C.

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. Spent Oxide and Sulphate of Ammonia purchased.

120 and 121, NEWGATE STREET, LONDON, E.C.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID from BRIMSTONE, for making SULPHATE OF AMMONIA of high quality and *good* colour. Delivery in our own Railway Tank-Wagons or Carboys. Highest references and all particulars supplied on application.

COZE'S Automatic Apparatus for CHARGING AND DISCHARGING GAS-RETORTS. For Illustrated Advertisement of this System, see p. 373.

Inquiries should be addressed to THE AUTOMATIC COAL-GAS COMPANY, LIMITED, 86-86a, LEADENHALL STREET, E.C.

BENTLEY & CO.

MANCHESTER ELECTRICAL STORES.

FOR Batteries, Bells, Wires, and Special Electrical Apparatus, address the best house 17, NEWTON STREET, PICCADILLY, MANCHESTER.

TAR and Liquor wanted.

BROTHERTON AND CO., Commercial Buildings, LEEDS.

WANTED, by a young Man, Son of a Gas and Water Superintendent, a SITUATION in Gas or Water Works. Has had charge of Main and Service laying. Experience in general outside Works. Age 22. Good reference.

Apply, by letter, to No. 1848, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, by an experienced Man, a Situation as MANAGER or FOREMAN. Has had first-class experience in carbonizing. Completely understands both the Manufacture and Distribution of Gas; and also the construction of, and general work on a Gas-Works. Antecedents will bear the strictest investigation.

Apply, by letter, to No. 1838, care of Mr. King, 11, Bo t Court, FLEET STREET, E.C.

WANTED, immediately, a Clerk of Works, to superintend the Building of a Gasholder, Tank, &c., at a Gas-Works in South Wales.

Apply to Mr. C. S. ELLERY, Engineer, BATH.

STOKER Wanted, at a small Gas-Works (night duty), and to extinguish Street Lamps in Winter. Arrangements will be made for constant employment.

State wages required, and present or last employment, to the MANAGER of the Gas and Water Works, Swanage, DORSET.

FOR SALE—One Single Gasholder, 80 feet by 20 feet (owing to extensions at Blackpool). To be erected complete; in first-rate condition.

Apply to CLAYTON, SON, AND CO., LIMITED, Hunslet, LEEDS.

FOR SALE—One 20,000 feet per hour Station Meter in rectangular case, together with Bye-pass and Valves. All in first-class condition. Also four 12 feet square PURIFYING BOXES, with centre valve and connections.

For particulars apply to the undersigned,

ROBERT PORTER,
Secretary and Manager.

Gas-Works, Flland,
Aug. 1, 1890.

THE Hornsey Gas Company have for SALE Two Cast-Iron TOWER SCRUBBERS—one 7 ft. 6 in. diameter by 30 feet high, and the other 10 feet diameter by 40 feet high—in good condition.

Full particulars can be obtained at the GAS-WORKS, Clarendon Road, HORNSEY, N.

TO BE SOLD—A Single-Lift Gasholder. 45 feet diameter by 15 feet deep; in good condition.

Apply to CHARLES ELLIOTT, Gas Manager, Leyland near PRESTON.

LLANBERIS GAS-WORKS.

TO BE SOLD cheap, by Private Treaty, the above Works, erected in 1871 at a cost of £2500, which are compact and in good working order. Freehold.

Apply to ROBERT ALGEO, Esq., MENAI BRIDGE.

FARNWORTH, NEAR BOLTON.

TO BE SOLD or Let on Lease (the whole, or such parts as may be agreed upon), the SITE of the late CHEMICAL WORKS at Prestolee, with Buildings thereon, and the use of Chimneys. Suitable for carrying on the business of Vitriol, Soda Ash, Bleaching Powder, Soap, and other manufactures. Coal and Water adjoining the Land, and convenient for carriage. A Canal, with a branch wharf, runs alongside the property.

Apply to JOSEPH LEACH, Estate Agent, FARNWORTH.

BOROUGH OF WORKINGTON.

TENDERS FOR GAS COAL.

THE Gas Committee of the Workington Corporation are prepared to receive TENDERS for the supply and delivery at the London and North-Western Railway Station, Workington, of about 5500 tons of GAS COAL, in such quantities as may be directed, from Oct. 1, 1890 to Sept. 30, 1891.

Tenders, specifying the description of the Coal with Analysis, the Pit at which it is raised, and the terms for net monthly payment, are to be sent, on or before the 19th inst., to the undersigned, endorsed "Tender for Coal."

The Committee reserve the right to divide the above quantity into two or more contracts.

JOHN WARWICK, Town Clerk.

Town Hall, Aug. 7, 1890.

TO TAR DISTILLERS.

THE Gas Committee of the Corporation of Blackpool are prepared to receive TENDERS for the surplus TAR produced for the next Twelve months from Aug. 1, 1890.

Tenders, endorsed outside, and addressed to the Chairman, must be sent in by the 23rd of August.

Particulars may be had from the undersigned.

JOHN CHEW, Gas Engineer.

Corporation Gas-Works, Blackpool.
Aug. 10, 1890.

TO GALVANIZED ROOF CONTRACTORS.

THE Gas Committee of the Corporation of Blackpool are prepared to receive TENDERS for the EXTENSION of the ROOF of their Coal-Shed.

Tenders, endorsed outside, and addressed to the Chairman, must be sent in by the 23rd of August.

Plans and specification may be seen at the Office of the undersigned.

JOHN CHEW, Gas Engineer.

Corporation Gas-Works, Blackpool.
Aug. 10, 1890.

EXTENSION OF TIME.
COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT.)

SPENT OXIDE.

THE Gas Committee invite Tenders for the purchase of about 850 tons of SPENT OXIDE.

Further particulars and forms of tender may be obtained from the Gas Engineer, Gas Offices, Bloom Street, Salford.

Sealed tenders, endorsed "Spent Oxide," to be sent to me not later than Five p.m. on Thursday, the 21st of August next.

By order,
SAML. BROWN, Town Clerk.

Town Hall, Salford, Aug. 7, 1890.

EXTENSION OF TIME.
COUNTY BOROUGH OF SALFORD.
(GAS DEPARTMENT)

OXIDE OF IRON.

THE Gas Committee are prepared to receive TENDERS for the supply of 500 tons of OXIDE of IRON for purifying the Gas at their Works.

Forms of tender and further particulars may be obtained on application to the Gas Engineer, Gas Offices, Bloom Street, Salford.

Sealed tenders, endorsed "Oxide of Iron," to be sent to me not later than Five p.m. on Thursday, the 21st of August next.

By order,
SAML. BROWN, Town Clerk.

Town Hall, Salford, Aug. 7, 1890.

WALLASEY GAS-WORKS.

TO TAR DISTILLERS AND OTHERS.

THE Wallasey Local Board are pre- pared to receive TENDERS for the purchase of the surplus GAS TAR (about 1000 tons per annum), produced from time to time at their Gas-Works, Great Float, near Birkenhead, during a period of One, Two, or Three years, from the 30th of September next.

A pipe is laid between the Gas-Works and the Great Float for the conveyance of the Tar into the Contr ctor's boats; and the Board will, if necessary, provide appliances on their own siding, to pump the Products direct into Contractor's railway tank-wagons.

Any further information may be obtained on application to Mr. H. Ashton Hill, Gas and Water Manager to the Board.

Sealed tenders, endorsed "Tar," and addressed to the Chairman of the Gas and Water Committee, to be left at my Office, as below, not later than Five o'clock in the afternoon of Monday, the 25th inst.

The Board do not bind themselves to accept the highest or any tender.

By order,
WM. VICKERS, Clerk to the Board.

Public Offices, Egremont, Cheshire,
Aug. 8, 1890.

ROCHESTER, CHATHAM, AND STROOD GAS-LIGHT COMPANY.

SUPPLY OF COAL.

THE Directors of the above Company invite TENDERS for the supply of 29,800 tons of GAS COAL, to be delivered between the 16th of September prox. and the 30th of June, 1891.

Particulars and form of contract may be had on application to

WILLIAM SYMS,
Secretary and Manager.

Gas Office: 58, High Street,
Rochester, Aug. 9, 1890.

TENDERS FOR TAR.

THE Directors of the Exeter Gaslight and Coke Company invite TENDERS for their surplus TAR for One year from the 14th day of October next.

Delivery on Company's Works filled into purchaser's tanks.

Payments, cash monthly.

Sealed tenders, endorsed "Tender for Tar," will be received by the undersigned on or before Friday, the 12th day of September next; but the Directors do not bind themselves to accept the highest or any tender.

By order,
W. A. PADFIELD, Secretary and Manager.

Gas Offices: 248, High Street, Exeter,
Aug. 6, 1890.

BOROUGH OF CHORLEY.

TO CHEMICAL MANUFACTURERS AND OTHERS.

THE Chorley Corporation invite Tenders for the supply of from 80 to 100 tons of SULPHURIC ACID made from brimstone, during a period of One year, from the 1st of September next.

Tenders, endorsed "Vitriol," accompanied by samples, to be sent to me before Three o'clock on Wednesday afternoon, the 20th of August inst.

The Corporation do not bind themselves to accept the lowest or any tender.

By order,
THOS. A. JACKSON, Town Clerk.

Town Hall, Chorley, Aug. 4, 1890.

BOROUGH OF CHORLEY.

TO GAS ENGINEERS AND OTHERS.

THE Chorley Corporation are prepared to receive TENDERS for the supply and fixing of a SQUARE STATION METER, capable of passing 80,000 cubic feet of gas per hour, with Valves, &c., complete.

Copies of specification and forms of tender can be obtained on application to Mr. Wm. Blackledge, Gas Manager, Chorley.

Tenders, endorsed "Station Meter," to be sent to me before Three o'clock on Wednesday afternoon, the 20th of August inst.

The Corporation do not bind themselves to accept the lowest or any tender.

By order,
THOS. A. JACKSON, Town Clerk.

Town Hall, Chorley, Aug. 4, 1890.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Gloucester Gas- light Company invite TENDERS for the surplus TAR produced at their Works for One, Two, or Three years, from the 1st day of October next.

The Tar will be delivered into Boats or Barges at the Company's Wharf, on the Gloucester and Berkeley Canal.

Offers to be at per ton of 200 gallons.

Payments cash monthly.

Further particulars may be obtained on application to Mr. R. Morland, the Company's Engineer.

Sealed tenders, endorsed "Tender for Tar," and addressed to the Chairman, Gas Offices, Quay, Gloucester, to be delivered not later than Tuesday, the 26th day of August inst.

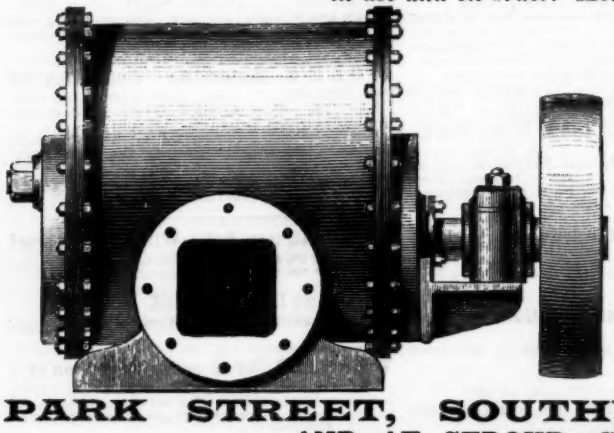
The Directors do not bind themselves to accept the highest or any tender.

By order,
WILLIAM E. VINSON, Secretary.

Gas Offices, Gloucester, Aug. 7, 1890.

G. WALLER & CO.'S
PATENT FOUR AND THREE BLADE GAS EXHAUSTERS.

With or without Engine combined. To pass up to 300,000 cubic feet per hour. Nearly 200 in use and on order. Model sent for inspection.



SPECIAL ADVANTAGES.

1. It gives a more **steady gauge** at all speeds than any other Exhauster.
2. It will deliver fully **one-third more** per revolution than the Beale Exhauster.
3. It has not any **Segments or Rings** to cause friction.
4. The Cylinder being a **circle** and the blades **radial from the centre,** it can be driven at a higher speed than any other Exhauster.
5. No **heavy Fly-Wheel** needed; and **one-third less** power required.
6. The **only system** by which Exhausters **can be altered** to pass from **30 to 40 per cent.** more with same Driving Gear and Connections.

Oldest Makers of BEALE'S EXHAUSTERS for 300 Works.

SPECIALITY—Elevating and Conveying Machinery for Coal, Coke, Oxide, Lime, &c.

PARK STREET, SOUTHWARK, LONDON, S.E.,
AND AT STROUD, GLOUCESTERSHIRE.

HOLMSIDE GAS COALS.

THE Owners of Holmside and South Moor Collieries possess an undivided area of nearly 5000 acres of COAL in the County of Durham, over the greater portion of which area the most of the best Coal of the district, including the well-known Hutton Seam, remains almost untouched; and as preparations are being made for working the Hutton Seam on a large scale, it is expected that the reputation of HOLMSIDE GAS COALS will be still further increased. The Holmside and South Moor Collieries have been in the hands of the same families for over half a century; but, until lately, no adequate attempt has been made to open out their very large Coal-Field, notwithstanding that the best Coal of the district around them, and especially the Hutton Seam, has been for some time past seriously diminished by reason of the vigorous workings of neighbouring coal-owners. Holmside Gas Coals are now being worked out of Holmside and South Moor Collieries at a rate of about 2200 tons per working day—a rate totally inadequate to meet the existing demand. By an extensive development of workings in the Hutton Seam, it is hoped that the demand may be fully met, and the quality raised to the highest point attainable by Durham Coal.

For price and particulars, apply to MARK ARCHER, Holmside and South Moor Offices, Quayside NEWCASTLE-ON-TYNE.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Kingston-upon-Thames Gas Company are prepared to receive TENDERS for the purchase of the surplus TAR made at their Works, from the 1st day of September next to the 30th day of June, 1891.

The probable quantity will be 180,000 gallons.

Full particulars may be obtained on application to Mr. Packham, Engineer of the Works, Lower Ham Road.

Tenders to be sent in, addressed to the Chairman of the Directors, not later than Wednesday, Aug. 13, 1890.

The Directors do not bind themselves to accept the highest or any tender.

By order,
J. A. FRICKER, Secretary.

Aug. 6, 1890.

LONDON COUNTY ASYLUM, COLNEY HATCH, N.

THE Sub-Committee of Visitors are pre-pared to receive an OFFER for the purchase of TAR and AMMONIACAL LIQUOR for the Twelve months ending Sept. 30, 1891.

Terms, cash on removal.

Forms of tender, containing estimated quantities for sale, may be obtained on application to the Steward at the Asylum; and the tenders, duly filled up, must be sent in sealed covers, marked "Tender for Purchase of Gas Tar, &c.," to the undersigned, on or before Wednesday, the 27th inst.

The person or firm whose tender is accepted will be communicated with on or before Sept. 1 prox.

R. W. PARTRIDGE,
Clerk to the Asylums Committee.

40, Craven Street, Strand,
Aug. 6, 1890.

TIPTON GAS-WORKS.

COAL CONTRACTS.

THE Gas Committee of the Tipton Local Board invite TENDERS for the supply of GAS COAL, for a period of One, Two, or Three years, from the 1st of September next, in annual quantities of about 9000 tons, to be delivered, carriage free, to the Gas-Works Sidings (London and North-Western Railway).

Specification and form of tender may be obtained at the Gas-Works, on application to Mr. Vincent Hughes, the Engineer and Manager.

Sealed and endorsed tenders to be sent to me, the undersigned, not later than Ten a.m., on Monday, the 25th inst.

The Committee do not bind themselves to accept the lowest or any tender.

By order,
GEO. M. WARING,
Clerk to the Board.

Tipton, Aug. 8, 1890.

SALE OF GAS COKE AND COKE BREEZE AT THE ROYAL ARSENAL, WOOLWICH.

THE Secretary of State for War is pre-pared to receive TENDERS for the purchase of such quantities of GAS COKE and COKE BREEZE as may be for disposal during the period of One year from the 1st of October, 1890, at the Royal Arsenal, Woolwich, where forms of tender and all information may be obtained, on application to the Superintendent of Building Works.

Parties tendering will be at liberty to submit offers for either the Coke or the Breeze, or for both, and are requested to make themselves acquainted with the mode of measurement at the Royal Gas Factory.

The tenders are to be delivered at the War Office, Pall Mall, S.W., by Twelve o'clock noon, on Monday, the 1st day of September, 1890, addressed to the Director of Army Contracts, and marked on the outside "Tender for the Purchase of Coke and Breeze."

EVAN COLVILLE NEPEAN,
Director of Army Contracts.

War Office, Pall Mall, S.W.,
Aug. 11, 1890.

SPENT OXIDE.

OFFERS are invited for 40 to 50 tons of SPENT OXIDE, containing 40 to 50 per cent. of Sulphur.

Quote price f.o.r. Middlesbrough to No. 1847, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

MITCHAM AND WIMBLEDON DISTRICT GAS-LIGHT COMPANY.

(INCORPORATED BY ACT OF PARLIAMENT, 1867.)

NOTICE is hereby given that the Forty-Seventh ORDINARY HALF-YEARLY GENERAL MEETING of the Shareholders of this Company will be held in the Board-Room at the Works, Mitcham, in the County of Surrey, on Tuesday, the 26th day of August, 1890, at Three o'clock in the afternoon precisely, to receive the Report of the Directors and a Statement of the Accounts for the Half Year ended the 30th day of June last, to declare a Dividend, and for General Business.

The Transfer Books will be closed from the 11th inst. until after the Meeting.

By order,
BENJAMIN GREEN,
Secretary and Manager.

Offices and Works: Merton Lane,
Mitcham, Aug. 5, 1890.

Price 2s. per dozen, or 10s 6d. per 100, post free.

CONSPIRACY and Protection of Pro-perty Act. It is required, under a Penalty of FIVE POUNDS, that a Printed Copy of the 4th Section of this Act shall be posted up at all Gas-Works, in a conspicuous place, where the same may be conveniently read by the persons employed thereat.

Printed copies of this Section, in large type, on broad sheets, may be obtained of WALTER KING, 11, Bolt Court, FLEET STREET, E.C.

*** *The Act extends to Scotland and Ireland.*

Fcap. 4to, Cloth, Gilt Lettered, numerous Illustrations, price 7s. 6d., post free.

Practical Photometry:

A GUIDE TO THE STUDY OF THE

MEASUREMENT OF LIGHT.

By William Joseph Dibdin, F.I.C., F.C.S.,

Chemist and Superintending Gas Examiner to the London County Council.

London: WALTER KING, 11, Bolt Court, FLEET ST., E.C.

JUST PUBLISHED.

EDITED BY CHARLES W. HASTINGS.

The Gas & Water Companies' Directory, 1890,

With new Sections, Electric Lighting, and Traders' Directory.

5s. Post Free.

GAS-WORKS STATISTICS, 1890,

3/6, Post Free.

WATER-WORKS STATISTICS, 1890.

2/6, Post Free.

The above Three Works Handsomely Bound in Cloth, in One Volume,

PRICE 10s. POST FREE.

These Books have been thoroughly revised to date, and contain much valuable and additional information.

LONDON:
HAZELL, WATSON, & VINEY, LD.,
1, CREED LANE, E.C.

Price 6s., Cloth Bound, Bevelled Boards,

THE

GUIDE-FRAMING OF GASHOLDERS

AND OTHER PAPERS

CHIEFLY RELATING TO

STRAINS IN STRUCTURES CONNECTED WITH GAS-WORKS.

BY

F. SOUTHWELL CRIPPS, Assoc. M. Inst. C.E.

Reprinted from the JOURNAL OF GAS LIGHTING, *Fully Revised and Corrected by the Author, with many Additions.*

LONDON:
WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Inventions may be secured for Twelve months; or LETTERS PATENT which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

ROBERT MARSHALL,

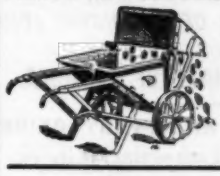
CANNEL COAL MERCHANT,

97, WELLINGTON STREET, GLASGOW.

Prices and Analysis of all the Scotch Cannels on application.

NOTE ALTERATION OF ADDRESS.

PRICE'S PATENT COKE & COAL BARROW



effecting a great saving of time, labour, and expense.

For particulars, price, &c., apply to Mr. E. PRICE, Inventor and Patentee, 22, Alwyne Road, Canonbury, LONDON, N.

Prices are Reduced.

SOOTHILL WOOD CANNEL.

Yield of Gas per Ton, over 12,000 Cubic Feet.
Illuminating Power - - - - - 26 Candles.
Coke per Ton, - - - - - - - 57 per cent. of a quality almost equal to that made from the best Coking Coal.

For Analysis and Price, apply to

The Soothill Wood Colliery Co., Ld.,

SOOTHILL WOOD COLLIERY,

BATLEY, YORKSHIRE.

JAMES NEWTON & SONS,
(Established 1820)

FIRE-BRICK AND TILE MERCHANTS,

Wholesale and for Exportation,

FALCON DOCK, 78 AND 79, BANKSIDE,

SOUTHWARK, LONDON, S.E.

DEPÔT for STOURBRIDGE AND NEWCASTLE FIRE-BRICKS, LUMPS, TILES and FIRE-CLAY and every Article suitable for

GAS AND WATER WORKS.

UNEQUALLED.

Gas Companies are solicited to try Samples of the

MIRFIELD

BLACK BED GAS COAL.

Prices and Analysis on application.

MIRFIELD (GAS-COAL) COLLIERY COMPY.

MIRFIELD, NORMANTON.

PATENTS FOR INVENTIONS,

REGISTRATION OF TRADE MARKS and DESIGNS in all Countries.

SEARCHES made *re* novelty, and opinions given on all matters connected with above. *Full particulars on application to*

J. C. CHAPMAN,

Assoc.M.Inst.C.E., M.Inst.M.E., Fel. Inst. Patent Agents,

70, CHANCERY LANE, LONDON, W.C.

Special experience in Gas and Ammonia Plant.

NEWBATTLE CANNEL.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,

LIMITED,

NEWBATTLE COLLIERIES,

DALKEITH, N.B.

PREPARED HYDRATED OXIDE
FOR PURIFYING COAL GAS.
As extensively used in Yorkshire, Lancashire, the Midlands, and Abroad.

Manufacturers: BAILES & HALLSWORTH,
Armley, Leeds, & at Bradford, Manchester.

G. E. TOURNAY,
Contractor for the Erection and Re-Building of
GAS-RETORT SETTINGS,
CHIMNEY SHAFTS,
FURNACES, & BOILER SETTINGS,
THANNINGTON, CANTERBURY.

THOMAS ILLINGWORTH,
NORTH DEAN CHEMICAL WORKS,
Near HALIFAX,
MANUFACTURER OF SULPHURIC ACID
OF EXTRA QUALITY FOR MAKING
WHITE SULPHATE OF AMMONIA.
TAR, LIQUOR, AND SPENT OXIDE
Purchased for Cash against Delivery.

CAST-IRON PIPES
FOR GAS AND WATER.
VALVES
FOR GAS, WATER, AND STEAM.
TELEGRAMS: "PIPES GLASGOW."
WM. MACLEOD & CO.,
56, ROBERTSON STREET, GLASGOW.

GAS AND WATER PIPES.
1¼ to 12 IN. BORE.

THOMAS ALLAN & SONS,
Bon Lea Foundry,
SOUTH STOCKTON-ON-TEES.
ALSO MANUFACTURERS OF
SANITARY & RAIN-WATER PIPES, HOT WATER PIPES, STABLE FITTINGS, RANGES, STOVES, And GENERAL CASTINGS.
GLASGOW OFFICE: 24, GEORGE SQUARE.
Telegrams:
"BONLEA, STOCKTON-ON-TEES."
"SPRINGBANK, GLASGOW."

TROTTER, HAINES, & CORBETT,
Brettell's Estate
FIRE-CLAY & BRICK WORKS,
STOURBRIDGE.
Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.
Proprietors of
BEST GLASSHOUSE POT & CRUCIBLE CLAY.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

THOS. W. WARD,
COKE & IRON MERCHANT,
Fitzalan Chambers, SHEFFIELD,
BUYER of OLD GASHOLDERS,
Every description of Scrap Iron and Steel, Works for Dismantling, Disused Engines, Boilers, &c., in any part of the Country for Cash.

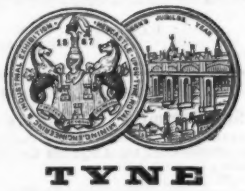
FIRE-BRICKS. FIRE-CLAY.
JAMES WHITE & CO.,
Albert Oil-Works,
WIDNES, LANCASHIRE.
Sole Proprietors of the Largest and Purest Beds of Fire-Clay in England.
FOR GAS FURNACES our GANNISTER and SILICA FIRE-BRICKS are acknowledged to be the best and most durable in the market.
GANNISTER and SILICA FIRE-CLAY guaranteed of the Purest and Finest Quality.
ANALYSIS AND REFERENCES ON APPLICATION.

Lanemark Coal Co.,
LIMITED.
LANEMARK CANNEL AND GAS COALS.
Quotations and Analysis on application to
LANEMARK COLLIERY,
NEW CUMNOCK, N.B.
Shipping Ports: All the principal Scotch Ports.

THE BEST AND SIMPLEST SYSTEM OF
VALVES FOR PURIFIERS
Is Weck's Patent arrangement of Three-Way Disc Valves, either separate for Purifiers fixed in line, or arranged together as a
CENTRE-VALVE
When the Purifiers are fixed in square.
No Leakage. No Foul Gas passed in changing. All the Purifiers in action, or any less number. Clean Box emptied of Air before taking into use.
DESCRIPTIVE PAMPHLET ON APPLICATION.
F. WECK,
JOHN BRIGHT ST., BIRMINGHAM.

JAMES OAKES & Co.,
ALFRETON IRON-WORKS, DERBYSHIRE,
AND
Wenlock Iron Wharf, 21 & 22, Wharf Road,
CITY ROAD, LONDON, N.
Manufacture and keep in Stock at their Works (also large stock in London)
PIPES and CONNECTIONS, 1½ to 48 inches in diameter; and make and erect to order RETORTS, PURIFIERS, and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas Water, Railway, Telegraph, Chemical, Colliery, and other Companies.
NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts, and covers, and rendering leakage impossible.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for
CANNEL & COAL.



TYNE
BOGHEAD CANNEL.

Yield of Gas per ton	13,155 cub. ft.
Illuminating Power	38·22 candles.
Coke per ton	1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton	10,500 cub. ft.
Illuminating Power	16·3 candles.
Coke	70 per cent.

For Prices and complete Analysis, apply to
YOUNG, DANCE, & CO.,
COAL OWNERS, NEWCASTLE-ON-TYNE,
Or E. FOSTER & CO. 21, John St., Adelphi, LONDON, W.C.

Is now Ready, the Fifth Edition of the
HANDBOOK
FOR
Gas Engineers and Managers.
BY
THOMAS NEWBIGGING,
Member of the Institution of Civil Engineers.
PRICE: MOROCCO, GILT, 18s.; CLOTH, 15s.; DELIVERED FREE.
LONDON:
WALTER KING, "JOURNAL OF GAS LIGHTING," ETC., 11, BOLT COURT, FLEET STREET, E.C.

W. PARKINSON & CO.,

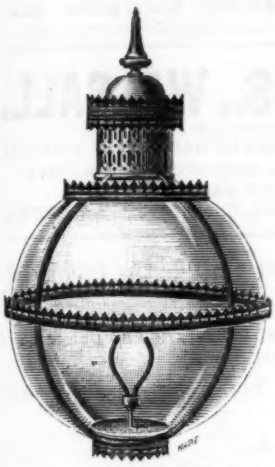
Having purchased the old-established Lamp and Meter Business of

MESSRS. JOHN BENT & SON,

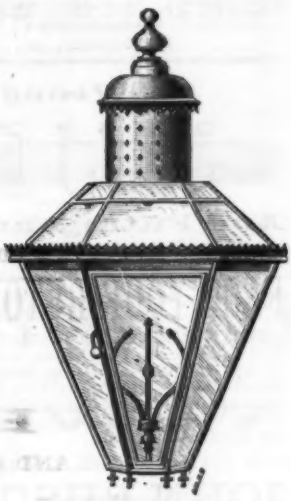
Are now Manufacturers of

IMPROVED LAMPS FOR STREET LIGHTING.

IN EVERY SIZE AND STYLE.



STREET LAMP METERS.
LAMP COCKS.



LAMPLIGHTERS' TORCHES.

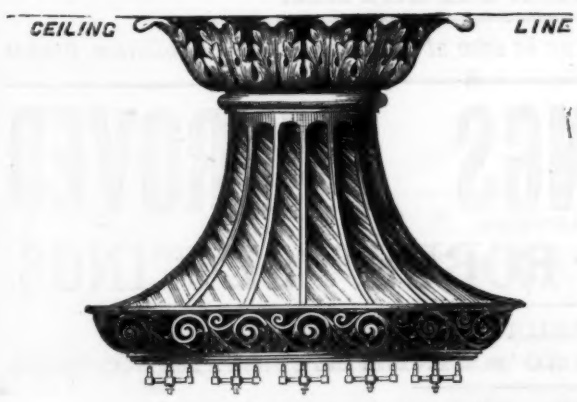
Our long experience in all branches of work connected with Street Lighting enables us to supply goods of the most improved construction, and of the highest quality.

PATTERN SHEET AND REFERENCES SENT ON APPLICATION.

ALSO SOLE MAKERS OF

HUNT'S PATENT

SUN-BURNER OR VENTILATING CEILING LIGHT.



HIGHEST ILLUMINATING POWER AND PERFECT VENTILATION.

ESTIMATES SUBMITTED FOR LIGHTING BUILDINGS OF ANY DIMENSIONS.

VENTILATING FLUES SUPPLIED AND FIXED COMPLETE.

EXTENSIVELY IN USE IN PUBLIC OFFICES, CHURCHES, HALLS, ETC.

ECONOMICAL IN FIRST COST AND VERY DURABLE.

MADE IN VARIOUS SIZES. TESTIMONIALS ON APPLICATION.

COTTAGE LANE WORKS, CITY ROAD,
LONDON.
Telegraphic Address: "INDEX."

BELL BARN ROAD WORKS,
BIRMINGHAM.
Telegraphic Address: "GAS-METERS."

OFFICE: 10, MAWSON'S CHAMBERS, DEANSGATE,
MANCHESTER.
Telegraphic Address: "PRECISION."

See also Advts., pp. 342. 380.

ROBERT HOLSWORTH,
103, BOSTON STREET,
HACKNEY ROAD, LONDON, N.E.
Telegraphic Address: "HOLSWORTH LONDON,"
MANUFACTURER OF
FLAT and ROUND HEMP and MANILLA ROPES, LINES, SCAFFOLD CORDS, SPUN YARNS, GASKETS, and TWINES of every description; COAL, COKE, and CORN SACKS, TARPAULINS and WATERPROOF COVERS, MATS, and MATTING.
CONTRACTS TAKEN.
ESTABLISHED, 1831.

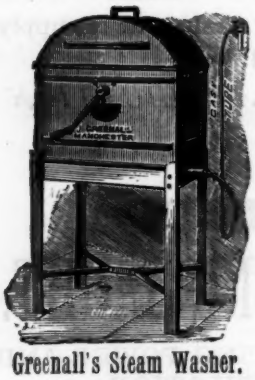
THE SILICA FIRE-BRICK COMPANY,
OUGHTIBRIDGE, near SHEFFIELD,
MANUFACTURE
SILICA BLOCKS, BRICKS, AND CEMENT
OF SUPERIOR QUALITY
FOR GAS-FURNACES.
Trade Mark: "SILICA."
These Goods (largely used in Gas, Glass, Iron, and Steel Works) are, on account of their
GREATER DURABILITY,
Strongly recommended where EXCESSIVE HEATS have to be maintained.

THOMAS TURTON AND SONS, LIMITED,
Sheaf & Spring Works,
SHEFFIELD,
MANUFACTURERS OF
FILES OF BEST QUALITY
FOR ENGINEERS.
STEEL OF ALL DESCRIPTIONS.
SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.
London Office:
90, CANNON STREET, E.C.
PARIS DEPÔT: 3, BOULEVARD DE BELLEVILLE.

Wrought-Iron
TUBES
And Fittings and Accessories.
LAMBERT BROS., WALSALL,
MANUFACTURERS OF
WROUGHT-IRON TUBES & FITTINGS for GAS, WATER, & STEAM.
BRASS GAS-FITTINGS, GAS-VALVES, STEAM & WATER VALVES, TOOLS, &c.; AND OF
WARNER'S PATENT MARKET GAS STAND-PIPE.
LONDON: T. LAMBERT & SONS, Short Street, LAMBETH

FACE YOUR RETORT MOUTHPIECES.
JOHN RUSCOE calls attention to his Retort Mouthpiece and Lid Facing Machines, which are in extensive use; also to his Lathes, Drilling, Slotting, Grooving, and Planing Machines, Smiths' Hearths, Smithy Fans, Roots' Blowers; also special Screwing Machines for Gas Tubes and Bolts, Taps, Wrenches, Pipe Cutters, special Taper and Twisted Rymers, Drills, &c.

PATENT TWISTED TAPS, DIES, & CUTTERS.
Thousands in constant work, give universal satisfaction.
Work Easier, Less Friction, Last Longer, and do Better Work than straight Grooves.
Main Drilling Stand, with Cup Drills, 1½ to 6 inch; Taps, Rymers, and Drills.
Ratchet Screwing Stocks, and Adjustable Once-up Stocks, Dies, Guides &c.
Inquiries and Trial Orders Solicited. Everything Guaranteed. Apply to
JOHN RUSCOE, Albion Works, Hyde, near Manchester.

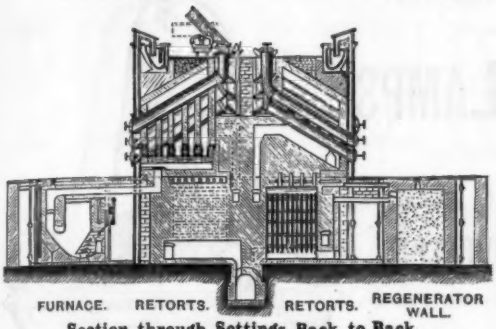
IMPORTANT TO GAS COMPANIES.
Hiring out Specialities for Gas Consuming.

Greenall's Steam Washer.
(ORIGINAL PATENT.)
Companies desirous of extending the use of Gas should see the "GREENALL" WASHING MACHINE. The Washer is admirably adapted for domestic purposes, and will execute the work in one-third the time occupied by any other system of washing clothes, while the labour is almost nil. To Laundrymen, the Machine is invaluable.
By removing the Cylinder, the Outer Tank can be utilized for Boiling Water, or for Hams, Puddings, &c., &c., and the Burner is adapted for Heating Flat Irons.
Particulars, with Testimonials and Terms, on application to the Manufacturer,
JOHN GREENALL, 120, Portland Street,
MANCHESTER.
The Gas Washing Machine can be seen at the Royal Military Exhibition, Chelsea.

RETORT SETTINGS IMPROVED
BY ADOPTING
THE "NUGENT" & "ROBUS" SETTINGS.
ECONOMY WITH DURABILITY GUARANTEED.
HUNDREDS OF SETTINGS WORKING EMINENTLY SATISFACTORY.
Estimates and Particulars for every Description of Retort Extensions and other Work.
J. & H. ROBUS,
CONTRACTORS FOR GAS AND WATER WORKS,
20, BUCKLERSBURY, LONDON, E.C.

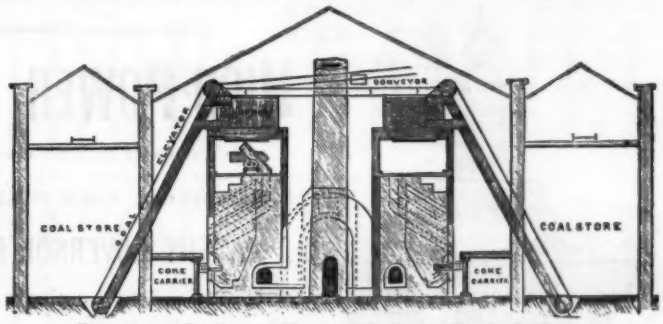
AUTOMATIC SYSTEM OF CHARGING & DRAWING INCLINED GAS-RETORTS.

Gold Medal, Paris Exhibition, 1889.

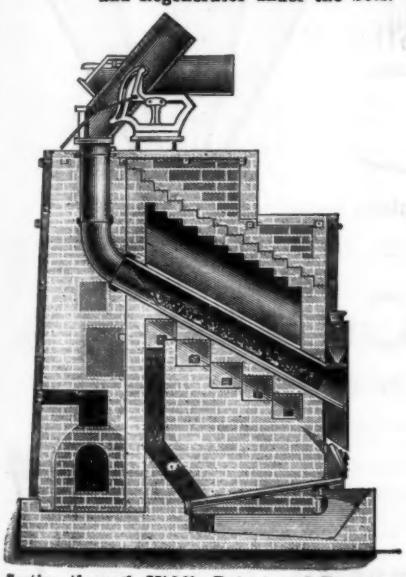
This System of Automatically Charging and Discharging Retorts without machinery or arduous labour is in operation at several places on the Continent and in America, and will shortly be at work in various Gas-Works in England.



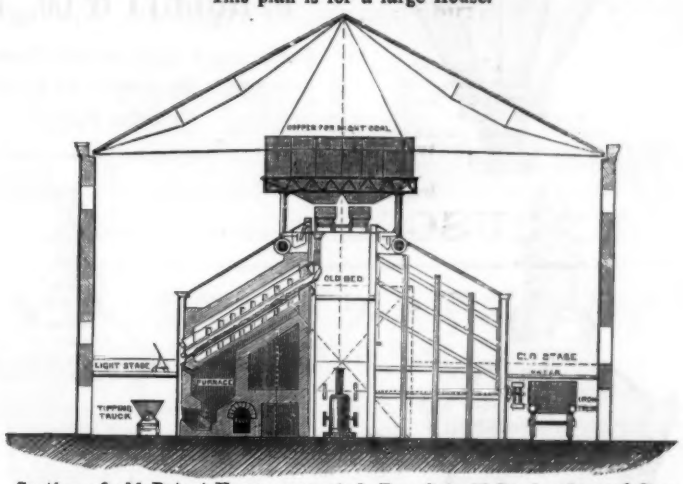
Section through Settings Back to Back.
Working off ground floor with Generator under Stage and Regenerator under the Sets.



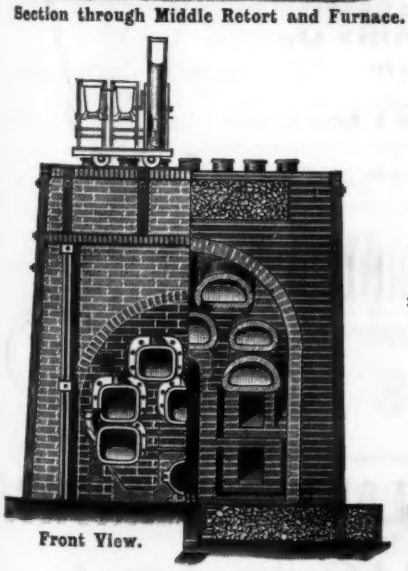
Transverse Section of House with Coze's Single Settings, Showing Method of working Two Single Settings and Distributing the Coal to the Supply Hoppers; the whole of the work being Automatic. This plan is for a large House.



Section through Middle Retort and Furnace.

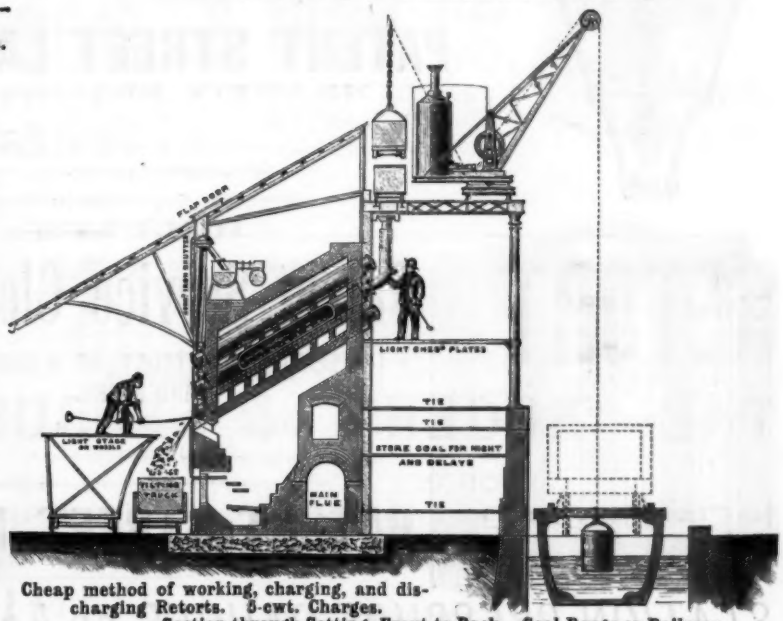


Section of old Retort-House converted, Two Sets 20 fts. in place of One. Modified form, with ordinary Retorts and Fittings.



Front View.

Section through Furnace & Bed.



Cheap method of working, charging, and discharging Retorts. 5-cwt. Charges.
Section through Setting, Front to Back. Coal Barge or Railway.
Light Corrugated Roof over Sets and at Sides.

These Systems are fully Patented, and any Infringer will be strictly proceeded against.

For further particulars apply to W. M. KIGHT, Secretary of THE AUTOMATIC COAL-GAS RETORT COMPANY, LIMITED, 86 and 88A, LEADENHALL STREET, LONDON, E.C.

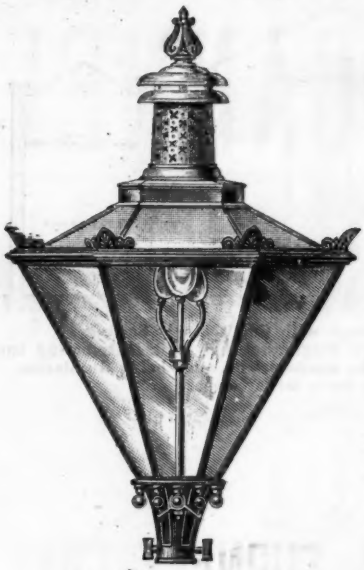
D. HULETT & CO., LIMITED,

GAS ENGINEERS,

55 and 56, High Holborn, London,

MANUFACTURERS OF EVERY DESCRIPTION OF GAS-FITTINGS,

GAS-METERS, GAS-LAMPS, GOVERNORS, ETC.



HIGH-POWER LAMPS

OF THE MOST IMPROVED CONSTRUCTION.

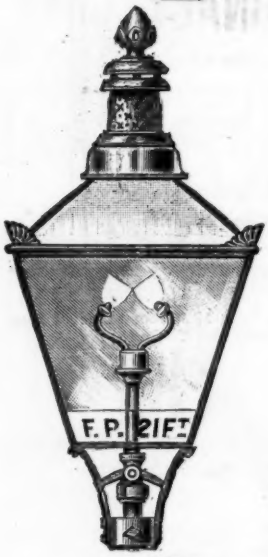
STRONG COPPER TOPS.

PATENT GOVERNOR BURNERS,

Giving from 16 to 450 Candle Power.

D. HULETT & Co., Limited,

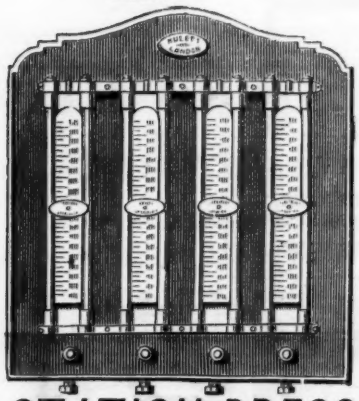
Invite Gas Companies and Local Authorities to compare the Quality of these Lamps with other Makers'.



PATENT STREET LAMPS.

NO PUTTY REQUIRED.

Several thousands of these have been made, and are giving every satisfaction. New Glass can be inserted in a few minutes by any inexperienced person.

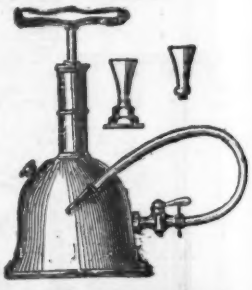


HULETT'S

Patent Service Cleanser,

FOR REMOVING OBSTRUCTIONS IN SERVICE-PIPES AND MAINS.

No Gas Company should be without this Valuable Invention.



PATENT STREET LAMP GOVERNORS.

STATION PRESSURE GAUGES, on Enamelled Iron Plates.

WROUGHT AND CAST IRON TUBES AND FITTINGS.

JAMES D. PERKINS. F. SEAVERNS.

PERKINS & Co.,

228 & 229, PRODUCE EXCHANGE, NEW YORK.

Cable Address: "PERKINS, NEW YORK." *Post Office Box 3695, New York.*

SOLE AGENTS FOR THE CELEBRATED

BRECKENRIDGE CANNEL

AND THE

OLD KENTUCKY BOGHEAD

OF KENTUCKY, U.S.A.

These Cannels will rank with the Australian Shale for Gas Manufacture.

Also General Sales Agents for

PENNSYLVANIA & VIRGINIA GAS COALS, & AMERICAN FOUNDRY & FURNACE COKE.

Delivery Prices made to any Port in

GREAT BRITAIN, ON THE CONTINENT, OR SOUTH AMERICA.

Full Information furnished upon Application to the above Address.

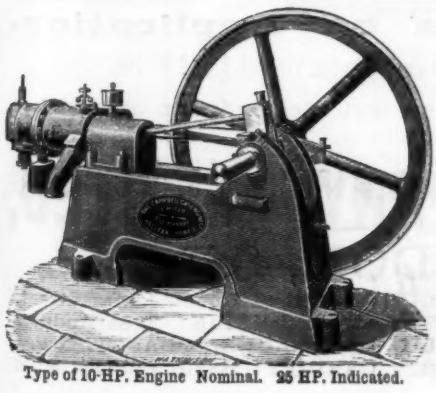
THE WIGAN COAL & IRON CO., LIMTD.,

Are exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, and supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, &c.

MIDLAND DISTRICT OFFICE: 22, TEMPLE ST., BIRMINGHAM—SOLE AGENT: A. C. SCRIVENER.
TELEGRAPHIC ADDRESS: "WIGAN BIRMINGHAM." TELEPHONE No. 200.

LONDON DISTRICT OFFICE: 6, STRAND, LONDON—C. PARKER & SON, SOLE AGENTS.
TELEGRAPHIC ADDRESS: "PARKER LONDON."

THE "CAMPBELL" GAS-ENGINE.



Type of 10-HP. Engine Nominal. 25 HP. Indicated.

GREAT SUCCESS.

20 PER CENT. CHEAPER THAN ANY OTHER.
Gives the Highest Satisfaction with all kinds of Work.

Testimonial from Mr. JAMES MOON, Engineer to the Filey Gas-Works.

Feb. 9, 1889.

GENTLEMEN,—We have been using one of your Gas-Engines on our Works for about four months, and I have pleasure in saying that it does its work in a very satisfactory manner. The engine is half-horse power, steady in all its movements, and, with ordinary care, will drive the exhaust apparatus at an even gauge.—I remain, Yours respectfully.

(Signed) JAMES MOON.

For Price Lists and full particulars, apply to the Sole Makers:

THE CAMPBELL GAS-ENGINE Co. LIMITED,

WELL LANE, HALIFAX, YORKS.

BELL'S ASBESTOS AQUOL PAINT

BELL'S ASBESTOS

IS MADE READY FOR USE.

IS FIRE RESISTING.
IS WASHABLE.
IS NON-POISONOUS.
IS MANUFACTURED IN ALL USEFUL COLOURS.
IS IMPERVIOUS TO HEAT, COLD, OR WATER.
IS WITHOUT SMELL.

No expensive Oil or Turpentine required.

WILL NEVER BLISTER.

HAS A COVERING CAPACITY **40** PER CENT. GREATER THAN LEAD PAINTS.

For Outside or Inside Work in any Climate.

Bell's Asbestos Aquol Paint is equally suitable for the finest decorative work as well as for general painting. It can be applied over or under any other paint, and, owing to its easy application, can be used with a large distemper brush; the SAVING THUS EFFECTED IN LABOUR BEING **50** PER CENT. OVER THAT OF LEAD PAINTS.

Bell's Asbestos Aquol Paint is susceptible of the most delicate treatment; and, owing to its perfect flatted surface, it brings up the varnish in a manner that no other paint can equal. ONE COAT OF VARNISH ON **Bell's Asbestos Aquol** IS EQUAL TO TWO COATS ON ORDINARY PAINT.

BELL'S ASBESTOS AQUOL PAINT is specially adapted for Private Houses, Exhibition Buildings, Ships, Churches, Asylums, School Boards, Railway Stations, and all work of Wood, Iron, Cement, Plaster, Stone, Brick, &c., &c.

Those who Study Economy and Protection from Fire should use only

BELL'S ASBESTOS AQUOL PAINT.

BELL'S ASBESTOS AQUOL PRIMING is made Ready for Use.
BELL'S ASBESTOS AQUOL PRIMING stops all suction of Wood, Cement, Plaster, &c.
BELL'S ASBESTOS AQUOL PRIMING should be applied to all New Work.

Suitable for Ceilings, Walls, and New Wood, and is very durable.

BELL'S ASBESTOS AQUOL KNOTTING, for Stopping Knots in New Work.

AN EXCELLENT CURE FOR DAMP WALLS.

Colour Cards and Price Lists on Application.

Supplied in Casks of 5 to 7 cwt., and Iron Drums of 28, 56, and 112 lbs., Sample Tins of 7 and 14 lbs.

Owing to its Covering Capacity, a **SAVING IN FREIGHT** of 40 per cent. is effected for a given surface.

BELL'S ASBESTOS COMPANY, LIMITED,

SOUTHWARK, LONDON, S.E.

DEPOTS—MANCHESTER: Cable Street, Blackfriars. LIVERPOOL: 2, Strand Street, James Street. HULL: Humber Dock Basin. GLASGOW: 35, Robertson Street. DUBLIN: 2, St. Andrew Street. AMSTERDAM: 264, N. Z. Voorburgwal. BERLIN, BARCELONA, and ANTWERP.
AGENTS—BIRMINGHAM: BELL and Co., 7, John Bright Street. CARDIFF: BELL and Co., West Bute Street.

BELL'S ASBESTOS

EXPANSION SHEETING.

The above, which can only be obtained from this house, is recognized as the **most efficient and economical jointing material in use.** It is composed of a specially-prepared India-rubber Compound, protected by a covering of Vulcanized Asbestos Sheeting, as shown above; and as it is the only Jointing Material which adequately **combines permanent elasticity with heat resistance,** the advantage it possesses will at once be seen.

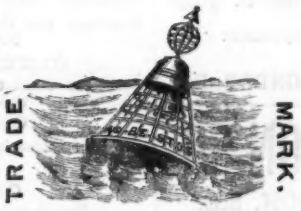
EXPANSION RINGS.

The centre from which the requisite elasticity is obtained will adapt itself to uneven surfaces to which it may be applied, and allow the expansion and contraction to be fully taken up. The covering being of Asbestos Cloth imparts a protection to the centre, and so prolongs its elasticity. **For Manhole, Mudhole, Steam Pipe, and Mash Tun Door Joints, it is unequalled;** and if applied as directed, **a ring can be used many times over.**

Made from 1-Ply for Cylinder and Faced Joints to any thickness for Uneven Surfaces.

BELL'S ASBESTOS CO., Ld.

DEPÔTS.
MANCHESTER: Cable St., Blackfriars.
LIVERPOOL: 2, Strand St., James St.
HULL: Humber Dock Basin.
GLASGOW: 35, Robertson Street.
DUBLIN, BERLIN.



BELL'S ASBESTOS.

DEPÔTS.
AMSTERDAM: 264 N. Z. Voorburgwal, BARCELONA, and ANTWERP.

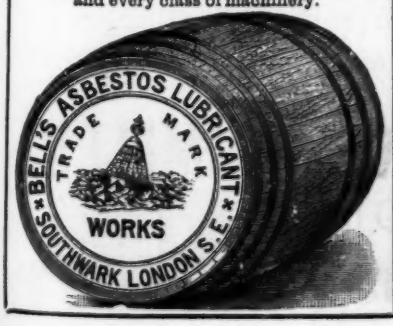
AGENTS.
BIRMINGHAM: BELL and Co., 7, John Bright Street.
CARDIFF: BELL and Co., West Bute St.

Southwark, London, S.E.

BELL'S ASBESTOS
YARN AND SOAPSTONE PACKING
Is the BEST LOCOMOTIVE PACKING made.

BELL'S
COMPOUND HYDRAULIC PACKING
Is specially suited for Hydraulic Machinery, Accumulators and Ammonia and all Pumps.

BELL'S ASBESTOS LUBRICANT
Is unequalled
For Steam-Engines & Cylinders, Gas-Engines, and every class of machinery.



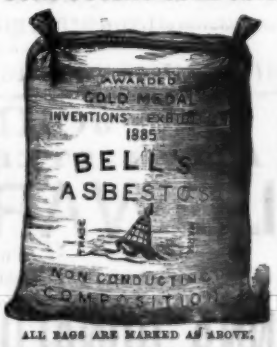
BELL'S ASBESTOLINE
The reputation of this Lubricant is based on the experience of thousands of users, which places it far in advance of those who rely only on mere laboratory tests.

ASBESTOLINE IS THE CHEAPEST MOST EFFICIENT, CLEANEST MOST INODOROUS AND SAFEST LUBRICANT.

ASBESTOLINE HAS SAVED 90 PER CENT. OVER OIL.
Has been used for all purposes, AND BEATEN ALL OTHER LUBRICANTS IN ACTUAL WORK.

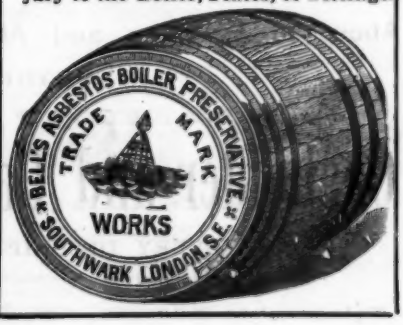
BELL'S ASBESTOS
"DAGGER" PACKING
Is unequalled for every kind of Marine and Land Engine, Steam-Pumps, &c., and has proved itself to be the most efficient durable, and economical Packing made.

BELL'S ASBESTOS
NON-CONDUCTING COMPOSITION.
Will reduce loss by radiation and saves 40 per cent. of fuel.
Is superior to any other, and saves its cost in a few months.



Can be applied again after many years' service.
Is sent out dry in bags: therefore cheaper than others sent out wet.
ALL BAGS ARE MARKED AS ABOVE.

BELL'S ASBESTOS
BOILER PRESERVATIVE
Will effectually keep Boilers clean, and remove any Incrustation, without injury to the Boiler, Plates, or Fittings.



HENRY BALFOUR & CO.,

LEVEN, FIFE,

MAKERS OF

GASHOLDERS

And all classes of GAS PLANT,

REVOLVING BRUSH SCRUBBERS, FOUR-WAY VALVES.

LONDON: 13, BILLITER STREET, E.C.

THE

ÉTOILE GAS-LAMP

(REGENERATOR).

Sole Makers and Proprietors,

THE ÉTOILE GAS-LAMP COMPANY,

Gas Lighting and Ventilating Engineers,

PRINCESS STREET, MANCHESTER.

WASHER-SCRUBBER and WATER TUBE,

SLOW-SPEED CONDENSER

(Kelman's English & American Patents).

These Apparatus are in use at the Gas-Works at Lincoln, Mountain Ash, Neath, Ellesmere (Salop), Woodstock (Cape Town); and Two large CONDENSERS, capable of dealing with **4,000,000** cubic feet of Gas per day have recently been erected at the Gas-Works at Sheffield. A large CONDENSER is also being erected at the Montreal Gas-Works.

PERFECT CONDENSATION. NO POWER REQUIRED.

For Prices and further Information, apply to

J. A. KELMAN, WINCHESTER HOUSE, LONDON, E.C.

THE THAMES BANK IRON CO.

UPPER GROUND STREET, LONDON, S.E.,

SUPPLY FROM STOCK

CAST-IRON RETORTS

AND ALL KINDS OF GAS-WORKS APPARATUS.

SOCKET-PIPES FOR GAS OR WATER PURPOSES.

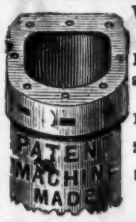
FLANGE PIPES FOR STEAM.

Sole Manufacturers of **LYON'S 'PATENT' GAS MAIN SYPHONS,**

AGENTS FOR

ATTERTON'S PATENT APPARATUS for CHARGING RETORTS.

WILLIAM INGHAM & SONS,



WORTLEY FIRE-CLAY WORKS,

Near LEEDS

Have confidence in drawing the special attention of GAS ENGINEERS to the following advantages of their Retorts:—

1. Smooth interior, preventing Adhesion of Carbon.
2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

PATENT

MACHINE-MADE GAS-RETORTS.

GEO. SHEPARD PAGE,

Of 69, Wall Street, New York, U.S.A.,

For thirty years closely identified with the Gas Industry in North and South America, and having a wide personal and influential acquaintance with Gas Managers, is desirous of opening negotiations with gentlemen in Great Britain and on the Continent who own or control new Inventions or Systems applicable to Gas Purification, Gas Consumption, and the Utilization of Gas Residuals, Ammonia, Tar, and Sulphur. He refers by permission to

GEORGE BOWER, Esq.,
Gas Engineer, St. Neots, England.

SIDNEY HERSEY, Esq.,
Secretary, Messrs. Kirkham, Hulett, and Chandler, Limited, London.

WALTER KING, Esq.,
"Journal of Gas Lighting," London.

WILLIAM YOUNG, Esq., and GEORGE BEILBY, Esq.,
Of Young and Beilby, Edinburgh.

THOMAS TURNER, Esq.,
President and Engineer Charleston (South Carolina) Gas Company, President American Gaslight Association.

GENERAL ANDREW HICKENLOOPER,
President Cincinnati Gas Company (Ohio), President Board of Trade Cincinnati, Ex-Lieutenant Governor of Ohio.

COLONEL JOSEPH R. THOMAS,
Editor "American Gaslight Journal," and President Society of Gas Lighting, New York.

GEORGE A. M'ILHENNY, Esq.,
President Washington Gas Company (District of Columbia).

W. H. PEARSON, Esq.,
General Manager and Secretary, Toronto Gas Company, Canada.

COLONEL WM. A. STEDMAN,
Consulting Engineer Newport (Rhode Island) Gas Company, General Manager Gas Department, American Electric Manufacturing Company.

E. M'MILLIN, Esq.,
Vice-President and General Manager Columbus (Ohio) Gas Company, President Western Association of Gas Engineers, Vice-President American Gaslight Association, President Board of Trade, Columbus.

J. P. HARBISON, Esq.,
Treasurer and General Manager Hartford (Connecticut) Gas Company, President New England Association of Gas Engineers.

JOHN BROWN & CO., LIMITED,

ATLAS STEEL AND IRON WORKS, SHEFFIELD,

ALDWARKE MAIN GAS COAL.

This Coal yields 12,600 feet of 19-candle gas per ton.
Weight of illuminating power in pounds of sperm, 820·80. Very free from impurities.

HANNA, DONALD, & WILSON

(Established 1851),

GAS ENGINEERS & CONTRACTORS,

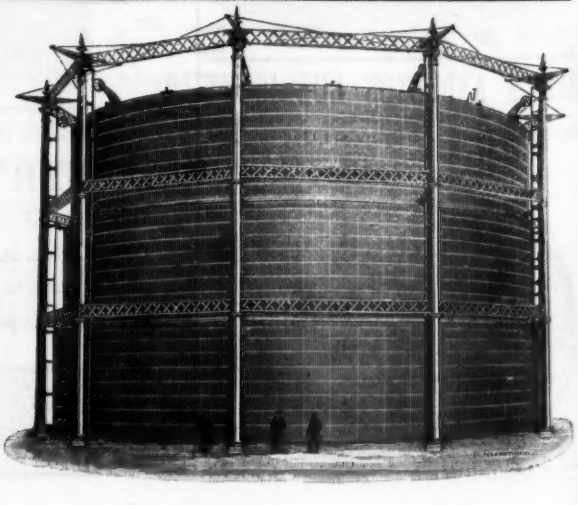
Abercorn Foundry and Abbey Works,

PAISLEY, N.B.,

MAKERS OF

Gasholder and Gas Plant

OF EVERY DESCRIPTION.



Telegraphic Address: "Donald Paisley."

TELEGRAPHIC ADDRESS: "GAS LEEDS."

CLAYTON, SON, & CO.

LIMITED,

LEEDS,

LONDON OFFICE: 69, QUEEN VICTORIA STREET, E.C.

MAKE

RETORT LIDS

OF ALL FORMS AND SHAPES IN IRON OR STEEL BY SPECIAL HYDRAULIC MACHINERY.

PRICES ON APPLICATION.

"THE METEOR."

NEW HIGH-POWER GAS-LAMP.

Westphal's Patent.

Gas Companies should hire these Lamps to their Consumers, and introduce them for Street Lighting as a rival to the Electric Light, as they do not get out of order, are most economical, and the Burner being a circular slit does not choke up.

Particulars and Prices Free.

HENRY GREENE & SONS,

SOLE CONSIGNEES FOR GREAT BRITAIN & COLONIES,

153 TO 155, CANNON STREET, LONDON BRIDGE, E.C.

S. PONTIFEX & CO.,

GAS and WATER ENGINEERS,

Manufacturers of and Contractors for the Maintenance of

PUBLIC LAMPS & LANTERNS;

GLASS—Flint Opal, and Bent in Stock, and Cut to Sizes.

WELL LAMPS, STREET NAME TABLETS,

LAMP COLUMNS, HEAD IRONS, PUTTYLESS LAMPS,

LANTERN COCKS, REGULATORS.

Improved High-Power Lanterns for Lighting Street Refuges and Open Spaces.

BROWN'S PATENT

LAMPLIGHTERS' TORCHES.

PROPRIETORS AND MANUFACTURERS OF

BOX'S PATENT

PUTTYLESS STREET LAMP.

This Lamp may be supplied fitted with clear opal, or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing Lamps to this system can be supplied at moderate prices.

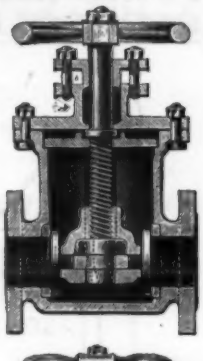
S. PONTIFEX & CO., 22, COLEMAN ST., LONDON.

Works: 18, STEPHEN STREET, TOTTENHAM COURT ROAD, W.

W. H-SPENCER & CO.,

HITCHIN, HERTS,

— *ENGINEERS.* —



PATENT CAM FULL-WAY VALVES,

1 INCH to 8 INCHES,

Instantaneous Grip and Release, occupying less Space than any other Full-Way Valve; made with either Internal or External Spindle. Gun Metal or Phosphor Bronze Valves, Seats, and Spindles.

Prices on Application.

CAST-IRON SYPHON PUMPS.

2½ by 6 in. Stroke - - £1 10 0 each.
2½ by 9 in. „ - - £1 16 0 „

WROUGHT-IRON DITTO.

2½ by 6 in. Stroke - - £1 13 6 each.
2½ by 9 in. „ - - £1 19 6

NET.

BEST

GAS COAL. REAL OLD SILKSTONE GAS COAL.

Address, THE STRAFFORD COLLIERIES COMPANY,

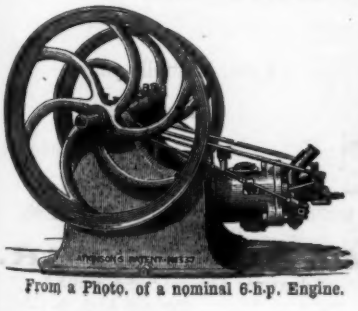
Near BARNSLEY, SOUTH YORKSHIRE.

MANLOVE, ALLIOTT, & Co., Ltd.,

ENGINEERS,

NOTTINGHAM,

LONDON, MANCHESTER, AND GLASGOW.



From a Photo. of a nominal 6-h.p. Engine.

ATKINSON'S "CYCLE" PATENT

GAS-ENGINE.

The simplest and most economical Gas-Engine made.

THE BEST ENGINE FOR ELECTRIC LIGHT.

Consumes less Gas per brake horse power than any other Gas-Engine.

TELEGRAPHIC ADDRESS: "MANLOVES NOTTINGHAM."

W. PARKINSON & CO.'S PRESSURE RAISERS

Have been supplied for many years, and are now in successful operation, for the purpose of

INCREASING THE PRESSURE IN LOW DISTRICTS, ETC.

The Machine acts as an Exhauster, drawing the Gas from the Main and propelling it according to the Pressure required. The result is obtained by a Wet-Meter Drum, which is revolved by Multiplying Wheels and Pullies, actuated by a Weight, as shown in the Engraving. The Pullies may be so arranged as to keep the Apparatus at Work for many hours, provided only there is sufficient depth for the Weight to fall. Pressure Raisers have been successfully employed in connection with Apparatus for the Manufacture of Oil Gas, &c. They are also used for supplying a current of Air for various purposes.

Made in Sizes from

5 to 200 LIGHTS.

SEE CATALOGUE.

TESTIMONIALS.

From Peter W. Barlow, Esq., F.R.S., F.G.S.
Engineer to the Tower Subway Co.

56, Landsdowne Road, W.,
Feb. 21, 1883.

DEAR SIRS,

The Gas-Pressure Engine in the Tower Subway acts most satisfactorily. It requires very little attention, and is very rarely out of order.

I am, yours truly,
PETER W. BARLOW.

Cork Gas Consumers' Company,
Gas-Works, Cork,
20th Feb., 1883.

GENTLEMEN,

In reply to yours, I beg to say that the Motive-Power Meters with which you have supplied this Company are doing very well. With them we are able to give a good supply to consumers in districts where it would be otherwise difficult to do so.

I am, faithfully yours,
THOMAS TRAVERS,
Engineer.

COTTAGE LANE WORKS, CITY ROAD,
LONDON.
Telegraphic Address: "INDEX."

BELL BARN ROAD WORKS,
BIRMINGHAM.
Telegraphic Address: "GAS-METERS."

OFFICE: 10, MAWSON'S CHAMBERS, DEANSGATE,
MANCHESTER.
Telegraphic Address: "PRECISION."

[See also Advt., p. 342.

London: Printed by WALTER KING (at the Office of King, Sell, and Railton, Ltd., 12, Gough Square); and published by him at No. 11, Bolt Court, Fleet Street, in the City of London.—Tuesday, Aug. 12, 1890.